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PREFACE.

THIS is an age of "Encyclopædias" and "Systems" in Medical Literature, but it seems to have been the aim of both the editors and publishers of those that have appeared to endeavor to make them as large as possible—to stretch them out volume after volume. Many of these are valuable reference books, but the price places them beyond the acquisition of the majority of practitioners, and even though they be in the library, they cannot be conveniently consulted, when it is so desired, on account of the bulk and the arrangement of the subjects.

In the present volume an effort has been made to avoid these objectionable features. The arrangement of the subject is ALPHABETICAL, with cross references for all synonymous terms. Each article is a comprehensive account of the disease, and gives the salient points of its etiology, symptoms, diagnosis, prognosis, and treatment. The entire field of the Science and Practice of both Medicine and Surgery is covered, and all the articles have been selected or prepared with special reference to the wants of the practical physician and surgeon; the aim of the editor having been to produce a book which should be pre-eminently USEFUL. The name of the author is appended to each article. The work, being in one volume, can lie on the desk, for constant use and ready reference.

AN

ENCYCLOPÆDIC INDEX

OF

MEDICINE AND SURGERY.

ABDOMEN, Contusions and Wounds of.—*Varieties.*—Contusion, contusion with rupture of muscles, contusion with rupture of viscera, wound of the parietes, wounds of the parietes with protrusion of uninjured viscera, wounds of the parietes with protrusion of wounded viscera, wounds of the parietes with wound of unprotruded viscera, wound of viscera without wound of the parietes.

Causes.—Blows, falls, the passage of wheels, pressure between opposing forces, wounds with knives, razors, daggers, sabres, bayonets, horns of animals, gun and pistol shot wounds, etc.

Symptoms.—These will depend on the variety. Contusions of the abdomen are characterized by discoloration or ecchymosis. Peritonitis may follow slight contusions.

When the muscles are divided there is a tendency to hernial protrusions, and dangerous hæmorrhage from possible rupture of the deep epigastric, circumflex iliac, and mammary arteries. There is pain, sudden in character, and probably attended by swelling, the result of effused blood, and probably indicated by a dent in, or by a marked separation of the torn ends of the muscle. The pain is increased on motion to such an extent that movements of the body may be almost impossible for a time.

Contusion with rupture of viscera is characterized by sudden, sometimes excessive, pain, great depression, intense anxiety, rapid pulse, vomiting, great thirst, coated and dry tongue, red at its edges, and early and excessive collapse if the stomach or bowel is ruptured. If the liver be ruptured there may be no symptom of it, or there may be abnormal tenderness over the region of the liver.

If the gall bladder is ruptured the symptoms are marked; they are: pain, anxiety, collapse, rapidly terminating in death. The other viscera, as the spleen, kidneys, etc., may be ruptured; the symptoms being in general those mentioned above.

The symptoms of wounds of the parietes without protrusion of the viscera will vary with the severity of the wound and the amount of damage done to the viscera. The symptoms will be those of shock, with the special symptoms of the injured viscus added.

Wounds of the parietes with protrusion of uninjured viscera, constitute a hernia without a sac. The symptoms vary from a state of simple shock to that of complete collapse. The small intestine and the omentum are the viscera that protrude most frequently.

With regard to the remaining varieties, namely: wounds of the parietes with protrusion of wounded viscera, wounds of the parietes with wound of unprotruded viscera, and wounds of viscera without wound of the parietes, the symptoms are in general those detailed above.

Prognosis.—Favorable, except when vital viscera are wounded.

Treatment.—The surgeon should ascertain without delay that the patient can pass water readily, and that there is no tinge of blood in the urine. The presence of blood generally indicates deep-seated extravasation and visceral injury.

Rest should be enforced in the recumbent posture, and strict confinement to bed may be necessary. Fomentations should be applied constantly to the part to relieve pain, soothe the soreness, and lessen the stiffness and discomfort of the bruised tissues. The diet should be regulated according to the patient's powers and constitutional state.

In extravasation of blood our watchfulness should be constant whenever the extravasation is so great in amount and of such an extent as to occasion a prospect of suppuration. This will be indicated by more or less constitutional disturbance, slight blush commencing on the surface of the skin over the wounded part, increased swelling, the inflamed skin becoming shiny, and tender to the touch. Should such evidences of suppuration manifest themselves, the fomentations should be changed for poultices, or lint and warm water under oiled silk. The earliest opportunity to give escape to matter must be sought by the surgeon. Especial care should be taken to prevent matter burrowing deeply for the want of ready external outlets, and if any sinuses exist or ensue, they must be laid open to the extreme extent of practicability and safety. When a free outlet is established the patient should be supported by generous diet and a liberal allowance of stimulants.

Where the peritoneum is ruptured the hæmorrhage may prove speedily fatal, or peritonitis, acute or chronic, may ensue. In this latter case leeches should be applied to the abdomen, and these should be followed by large and hot fomentations of moist flannels or flannel bags of bran or chamomile wrung out of hot water or large linseed meal and bran poultices. Opium should be given freely, fully, and frequently. The index to its limit is the effect on the system. Calomel in small doses, often repeated, may with advantage be combined with the opium. Purgation should be avoided. If constipation supervenes the mercurial treatment should be steadily persevered in.

If the intestine is ruptured the treatment is opium, rest, leeches to the abdomen, fomentations, sinapism, and turpentine on flannel. The patient may survive from a few hours to three or four days.

Rupture of the other viscera may take place. If it does, we may conclude that recovery is a result almost entirely dependent on the extent of the rupture. If it be slight, recovery may readily occur; if extensive, treatment is hopeless and death certain. Treatment should be as above detailed.

In wounds of the parietes without protrusion of the viscera, scrupulous attention having been paid to the condition of the wound, and it having been ascertained to be free of any foreign substance, the treatment should be very simple. The abdominal muscles are to be relaxed by position, especially if the edges of the wound have the least inclination to retract. As a rule sutures will be found most advantageous and effective in approximating and retaining the edges in apposition. Metallic wire sutures appear to offer many advantages over silk in such cases. It must, however, be borne in mind that in wounds of any depth about the abdominal walls, especially in the thicker parts or wherever the muscles overlap each other, it will be found difficult if not impossible to maintain perfect apposition of the whole surface of the cut. There is always a tendency in such wounds for fluid serous or sanguinous discharge to accumulate between the surfaces at the deepest parts. The existence of such fluid may be followed in a comparatively short time by foul suppuration, which, if allowed to remain confined would produce alarming constitutional disturbance. It must also be remembered that the treatment will be modified by the locality of the wound.

If there be severe hæmorrhage, and the wound not sufficient to allow the bleeding mouth of the vessel to be seen, no hesitation may be felt regarding treatment. The wound should be enlarged, until the wounded vessel can be seen *and can be secured.* Perfect rest, relaxation of the abdominal muscles, the stomach and bowels to be kept moderately empty by the administration of fluid food only, and the administration of opium as indicated by the symptoms will constitute the chief points of medical management.

In wounds of the abdomen with protrusion of the bowels or portions of other viscera through the aperture we will presume that the accident is a recent one. In such a case there is no time to lose in returning the protrusion, whether it be omentum, intestine, or other tissues. The surgeon having satisfied himself as to the nature of the protruded portion he must see that no foreign substances adhere to or are entangled in the protrusion. If such be the case the parts must, with gentleness and caution, be cleansed with tepid water, to free the peritoneum of all extraneous matter and to secure a perfectly clean surface. If the protruded portion is apparently omentum alone, care must be taken to ascertain that bowel is not wrapped up in the folds. If the protrusion consist of intestine care must be taken to ascertain that no injury has been occasioned to the peritoneum or that the coats have not been ruptured. These points being ascertained, the parts being sound and healthy, and the surface clean and free from extraneous matter, the replacement of the protruded mass into the abdominal cavity should at once be proceeded with. A ready replacement is not always easily effected. In such a difficulty it will sometimes answer to draw out a small portion more of the intestine and then on gently pressing upon it and propelling its contents into the interior, the protruded bowel will sometimes readily follow. If so much of the intestine has escaped that it cannot be returned, the orifice of the wound should be enlarged. Perfect reduction should be insured before closing the wound.

In those cases in which the protruded viscera are wounded the treatment of the wounded viscera alone need now be considered in addition to that detailed above. If there is a small punctured wound of the intestine a pair of forceps should be applied to the intestines at the wounded part to raise up this portion, and a very fine ligature immediately round the puncture so as to include it entirely. The ligature should then be tied firmly and the ends cut off close to the knot. If the wound is large one of two courses may be adopted. If a clean cut, the edges of the intestine should be sewed together. If an irregular lacerated wound the edges should be fixed to the external wound and the chance of an artificial anus risked.

Wounds of the viscera which occur in penetrating wounds through the abdominal wall are decidedly more formidable than those just considered. The danger is proportionate to the amount of hæmorrhage and extravasation into the peritoneal cavity.

In fine, we may conclude, 1. That a rupture of stomach or intestine without external wound is a fatal lesion; more fatal than when lesion of either viscus occurs with external wound. 2. That when rupture of liver or spleen is fatal, death is generally the result of hæmorrhage. Rupture of the gall-bladder is always fatal. 3. That when rupture of the kidney proves fatal, death, when occurring early, is the result of hæmorrhage; when occurring later, is the result of extravasation of urine. 4. That recovery from rupture of the liver, spleen or kidney is not improbable nor uncommon. 5. That a wound of the peritoneum, without bruise or laceration of tissues, is by no means necessarily fatal. 6. That a protrusion of intestine *or portion of other viscera, if the protruded* part be not bruised, nor long exposed, need not necessarily prove fatal. 7. That a wound of protruded intestine or stomach, if small, should be secured by ligature; if large, by sutures; and the protruded viscus returned into the abdomen. The former lesion may terminate in recovery; but wounds amounting to direct division of the canal are irreparable, unless artificial anus be established. 8. That a punctured wound of viscera is more dangerous than a wound with protrusion and less dangerous than rupture without external wound; that the danger is in proportion to the size of the internal; and that an artificial anus offers the best prospect of recovery when the wound is extensive.—EDWARD J. BERMINGHAM.

ABORTION.—*Definition.*—Expulsion of the ovum during utero-gestation before the eighth lunar month.

Causes.—These are in general reflex irritation; diseases of the ovum; the action of oxytoxics; affections of neighboring organs, and mechanical violence.

Symptoms.—These vary somewhat according to the cause and the period of pregnancy. Pain chiefly in the lumbar, sacral and hypogastric regions may be the only symptom noticed in early abortion. At a more advanced period there is a rigor followed by a febrile movement, palpitation, cold extremities, dimness of vision and dark rings surrounding the eyes, a cold, uneasy feeling about the pubes, with more or less weight in the same region, according to the size of the embryo. This sense of weight may also be experienced in the coxal region and is a characteristic and important sign. Lumbar pain and vesical tenesmus are of frequent occurrence. There is a cessation of the morning sickness if it has been present, and the mammæ become flaccid, although the pain in them is increased.

These symptoms are succeeded by increase in the lumbar pain, which becomes periodic and extends to the hypogastric region. A discharge of a hæmorrhagic nature takes place. Softening of the os and cervix can be made out, which slowly progresses till expulsion takes place.

Prognosis.—Favorable.

Treatment.—The treatment of abortion may be arranged under two heads: First, to prevent it when this is possible; and second, to favor expulsion when this is inevitable, and properly manage the placenta.

The measures to be adopted to prevent abortion when threatened are, rest, (and in the most obstinate cases nothing will do short of absolute confinement to bed, in the recumbent posture) avoidance of emotional causes and any local irritation which might act reflexly in the direction of the uterus; the patient should be cautioned against the effects of tight lacing. A careful inquiry into the circumstances attending former abortions should be made, and if it be found that diarrhœa, vesical irritation or any similar affection was a prominent symptom, it will be necessary to rectify the function thus disturbed. In weak and cachectic women a tonic treatment should be adopted.

But while the general health of the patient is thus attended to we must not overlook any special constitutional causes which may be in operation. The most important of these is syphilis, and the best chance of success in dealing with such cases is, whether the mother or father, or both, be affected, to bring them gently under the influence of mercury before coitus is again permitted. An examination of the structures expelled in former abortions may seem to call for certain special means of treatment in addition to the general course of procedure indicated. With the single exception, however, of the treatment of syphilis by mercury, we can place but little reliance on the medicinal treatment of habitual abortion, beyond what is administered with a view of giving tone to the system or allaying constitutional disturbance.

Having taken due cognizance of the symptoms which enable us to decide whether or not the loss of the ovum is inevitable, and being persuaded that there is room for hope, the efforts of the accoucheur will chiefly be directed to the expulsive contractions of the uterus. The success of his treatment will depend upon the power which the remedies he may employ will exercise upon this function of the uterus. Should any source of irritation exist he should at once attempt to remove or allay it. The most perfect quiet of mind and body is more important perhaps, than anything else. The patient should lie on her back on a hard mattress and be kept cool. She should change her position as seldom as possible, for any exertion, however slight, will often be attended with a gush of blood. Her food should be light and easy of digestion, and not only stimulants but animal foods should be forbidden to her. Hæmorrhage is one of the alarming symptoms which we desire to arrest if it be possible, and on this account it is well to give the food cold, or at least cool. Caution must however be exercised in the use of ice, either internally or externally, for if, as is sometimes done, all the food is iced, and in addition cold effusion and injection resorted to, we may excite reflex action of the uterus and thus defeat our ultimate object, although we may arrest the hæmorrhage. With the view of arresting uterine action nothing can be compared to opium, which is indeed our sheet anchor. To secure the full advantage of its sedative action it must be given in full doses, so that forty minims of the liquor opii sedativus, in two doses, at an interval of twenty minutes, may be given in most cases without the slightest hesitation. In other cases again, in which it may be inadvisable to give opium by the mouth, an ordidinary enema of starch, with a drachm of laudanum, will be preferred. Chloral, by the mouth or by injection, has also been employed with success. We must never despair so long as a chance remains of saving the ovum, bearing in mind that evidence of the death of the fœtus is an immediate warrant for suspending all operations which have for their object the retention of the product of conception. It is a safe and good rule that so long as we are not snre the fœtus is dead, we should act as if it were living.

When violent pains profuse hæmorrhage, discharge of the liquor amnii and progressive dilatation of the os show that abortion is inevitable, the treatment differs widely from the above, the object then being to promote instead of to prevent expulsion. In the first three months the less we interfere the better. The only symptom which is likely thus early to call for energetic treatment is hæmorrhage. If this should be sufficient to cause alarm we should not hesitate to plug the vagina. A piece of soft sponge of sufficient size to fill the vagina without producing uneasiness should be wrung out of pretty sharp vinegar and introduced into the passage up to the os uteri.

As in the case of other hæmorrhages, astringents are frequently given in abortion, sometimes with good effect. It is, however, in earlier abortions in which this is most marked, when acetate of lead, gallic acid, and the mineral acids may often be given with advantage. The more advanced the pregnancy the less we can rely on astringents. We must then resort to oxytoxics with the view of exciting uterine contractions of such force as to expel the ovum or such portions of it as may be maintained. A simple enema, or one containing turpentine, will often serve as a powerful incentive to uterine action. If the abortion is one of the sixth month we may sometimes be justified, when the hæmorrhage is alarming, in rupturing the membranes, as in an accidental case of hæmorrhage toward the end of pregnancy.

It is the expulsion of the placenta, however, in regard to which the greatest difficulty is often incurred. If the whole ovum is not expelled entire, *the os closes, and the placenta is retained*, we can do nothing but wait, unless the hæmorrhage is alarming, until after an interval of hours or days, as the case may be, hæmorrhage recurs, with more or less distinct pains and renewed uterine efforts. Great caution should here be exercised. If all be going on favorably it is better to leave the process to nature than to interfere prematurely. When the os is pretty well dilated or severe flooding calls for prompt action, the immediate removal of the placenta is, of course, our first object. It is impossible to lay down rules for the skilful performance of this manœuvre, which can only be taught by experience; but as a general rule more reliance is to be placed upon the fingers than upon instruments. Should such attempts be attended with failure, we should plug to restrain the loss of blood, and give ergot or some other oxytoxic agent.

The treatment after abortion is a question of considerable importance. In some cases all that is necessary is confinement to bed for a few days, and avoidance of fatigue and exertion for some time thereafter. In other cases more strict treatment is required. Should retained fragments of placenta give rise again to hæmorrhage, the patient must not be permitted to rise until all trace of this has ceased; and if her general health has suffered, a course of chalybeate tonics, change of air, tepid sea baths and the like must be resorted to. No more fruitful source of menstrual disorder or of chronic uterine disease exists than what arises from a want of due precaution at this critical period of a woman's existence.—William Leishman.

ABORTION, Frequent.—*Definition.*—Ovum expelled prematurely, often at the same period of utero-gestation.

Causes.—Syphilis primary or inherited; some acute diseases; ovarian tumors; fibrous tumors or fibro-cystic tumors of the uterus; flexions; constitutional weakness.

Symptoms.—Albuminuria (?); rigors, fever, followed by labor.

Signs.—Gradual weakening of the fœtal circulation, discharge of liquor amnii.

Diagnosis.—Cause sometimes difficult to trace.

Prognosis.—Unfavorable often to cure.

Treatment.—If due to syphilis. mercury, iodide of potassium, chlorate of potash, during the whole of pregnancy, and in the intervals during successive pregnancies. If albuminuria is a symptom, Roman bath, cupping over loins, digitalis, iron and quinine. In flexions, remedy the malposition. If through weakness, either rest or tonics with gentle exercise. In cases of ovarian tumor, the question arises as to the advisability of ovariotomy during pregnancy, or waiting. Mr. Spencer Wells's experience is in favor of the operation. Each case must be decided on its own merits. In cases of fibrous tumor, rest; further treatment to be deferred until after delivery. In some cases the Cæsarian section may be necessary.—Heywood Smith.

ABSCESS.—A circumscribed collection of pus. Two chief kinds, acute and chronic. Term "cold" is sometimes used as synonymous with chronic, and sometimes means a chronic abscess which has formed without any noticeable signs of inflammation.

Acute Abscess.—*Causes.* Injury, irritation of a foreign body, follicular obstruction, absorption of poison, especially by lymphatics, and some obscure constitutional conditions. *Symptoms.*—Chills, rigor; temperature often rises suddenly to 104. Local symptoms of inflammation. Throbbing pain, which becomes more dull and aching as pus forms. Œdema of skin. Fluctuation. The swelling, which is at first hard, gradually softens in centre. Pointing of abscess: the cuticle rises, the skin ulcerates or sloughs, and bursts. *Terminations.*—1, when opened either surgically or spontaneously, its walls fall together and it closes; 2, a sinus or fistula remains; 3, acute abscesses sometimes cause serious mischief by opening into blood-vessels and serous cavities. *Diagnosis.*—An acute abscess can scarcely be mistaken. *Treatment.*—Local rest very important; general rest in serious cases. Treat cause if possible. Warm moist applications. Quinine internally. Calomel (5 to 10 grains) if the tongue is not clean. *Indications for opening.*—1, when in sheath of a tendon; or, 2, under strong fibrous membranes; or, 3; anywhere else where pus is likely to burrow instead of coming to the surface; 4, near a joint; 5, under the periosteum; 6, when pressure is likely to be dangerous; 7, when it may cause some direct obstruction to some passage; 8, when caused by some noxious infiltrating fluid, *e. g.*, urine; 9, when a spontaneous opening would produce deformity, *e. g.*, in neck; 10, when near anus. After abscess is open, employ pressure, if necessary, to prevent fistula, but poulticing usually suffices as a dressing. *Method of opening acute abscess.*—1, By Paget's or Syme's knife or lancet; 2, by Hilton's method when deep and in a dangerous situation. "*Hilton's Method.*"—Incise skin and deep fascia; then push a director on into abscess; lastly, pass a pair of dressing forceps along director, and when they have entered the cavity, open the blades. Opening to be dependent, parallel with any neighboring important structures, and free.

CHRONIC ABSCESS.—*Causes.*—Dead bone; all causes of acute abscess, *quod vide.* Scrofula. Constitutional debility. *Signs.*—A swelling, at first hard, afterwards soft and fluctuating, usually situated near a lymphatic gland, or in some special situation, *e. g.*, in the psoas muscle, or in loose cellular tissue, *e. g.*, that of buttock. Often a certain amount of pain and tenderness; often evident disease of bone. Pressure on nerves may cause pain or spasm. Abscesses near mucous canals sometimes, but rarely, become emphsysematous. *Course.*—Often very tedious, usually tends to burst, either through skin or into some internal cavity, but usually the former. May remain stationary for years; and may contract while its contents partly degenerate, partly are absorbed. *Constitutional Effects.*—Usually little or none till it opens and its contents are exposed to the air. Then, if the abscess be of any size, decomposition of its contents tends to occur with high fever. Vide *Hectic Fever, Septicæmia, &c.* Liability to burrow, to open into important vessels, and to cause injurious pressure effects. *Diagnosis.*—From, 1, innocent and malignant tumors; 2, aneurisms. 1, in cases of doubt, use trochar, grooved needle, or aspirator. 2, *vide* ANEURISM. *Prognosis* depends upon size, position, age of patient, curability of cause, and upon treatment. Middle-age most hopeful. *Treatment.*—Remove cause; *vide* CARIES. If there is no great tensive pain, or if there is no reason to suspect that burrowing is going on, opening may be delayed. An effort may be made to obtain resolution by counter-irritation, iodine, mercurial plasters, and rest. Various modes of opening—1, by knife; 2, by trochar and canula; 3, aspirator; 4, caustics. Free openings, counter-openings, drainage tubes, repeated partial evacuations by aspirators, &c. *Antiseptic treatment*, quod vide. Dangerous septic symptoms, a probable consequence of prematurely opening a chronic abscess.

PUERPERAL ABSCESSES occur after parturition; are probably pyæmic in nature. *Locality.*—Iliac fossa, orbit, joints, thigh, &c.—C. B. KEETLEY.

ABSCESS, Fæcal—*See Perityphlitis, by* H. B. SANDS.

ABSCESS, Urinary.—Urinary abscess is most frequently a result of obstruction in the urethral canal, and may be regarded, in reference to its situation, as penal or ante-scrotal, scrotal, and intra-pelvic. Among these the perineal is the most common; next comes the scrotal; the intra-pelvic occurs usually in very advanced cases of stricture, &c., in which a fatal result is impending, and also as a consequence of operations; and the penal is rare, most frequently being caused by gonorrhœal inflammation of the urethra.

Occasionally, but by no means commonly, urinary abscess in the perineum may be met with, when there is no obstruction in any part of the urethra. When such is the case, there is some ground for suspecting that disease exists at or near the neck of the bladder, particularly disease of the prostate. In chronic suppurative disease of that organ perineal abscess sometimes appears.

Ordinary urinary abscess in the perineum may be acute or chronic; the former usually requires prompt interference on the part of the surgeon, and its presence is often indicated by constitutional symptoms, before local evidence appears of a marked character. If these are severe, and there are also tension, fullness and tenderness in the perineum, a free and deep incision made in the middle line will often give instant relief; and if matter is not seen at once, such a proceeding will do no harm, although nothing else result but a little bleeding, and the relief of tension. No considerable hæmorrhage need be feared, although sometimes, when there has been much inflammation in the part, a smartish trickling may continue for some little time. When it has ceased, a poultice should be applied to the wound. Great improvement in the patient's condition often takes place almost immediately; the fever subsides, and complete recovery may follow in a very short time.

The importance of speedily evacuating such collections of matter, even at the commencement of their formation, cannot be overrated. Matter pent up behind the deep perineal fascia which forms a partition too dense to be penetrated by the action of absorption, will find its way into the cellular tissue of the pelvis, by the side of the bladder, between it and the rectum, and give rise to dangerous consequences, or, in event of recovery, to urethro-rectal or vesico-rectal fistulæ. Otherwise it may burst into the urethra, and be discharged by the external meatus. The collection having thus opened, pus in some quantity escapes, usually alone, sometimes mixed with urine, but not neeessarily so. One of the main objects in making an early opening into a collection of matter in the perineum is to prevent the occurrence of any lesion of the urethral walls; if its evacuation be soon and fully insured, we may hope to find the cavity gradually closing, and that no urine will penetrate it, when there will be less fear of its remaining long open, or of its becoming an abnormal passage for the urine.

In the case of chronic abscess, it is desirable that an incision should be made when the presence of matter is perfectly evident. These abscesses are usually situated in the neighborhood of the bulbous portion of the urethra, and appear in the perineum and scrotum; sometimes as the result of a little ulceration behind the stricture, and escape of a drop or two of urine into the cellular tissue; oftener, perhaps, from the adjacent irritation, without having any direct communication at first with the urethra. This communication almost invariably takes place if the abscess breaks of itself, sometimes when it is opened by the lancet; but generally no urine appears when it is opened early, until some days after the operation, and occasionally not at all. An unnatural opening, however, having been established, the frequent passage of the urine through it, which must occur at each act of micturition if the stricture be narrow, prevents its closure. This artificial canal, usually termed urinary fistula, is one of the common accompaniments of neglected stricture, and often forms a troublesome complication.—SIR H. THOMPSON.

ACETABULUM, Fractures of—*See Fractures.*

ACNE MENTAGRA—*See Acne Sycosis.*

ACNE PUNCTATA.—*Definition.*—A disease of the skin caused by the retention of sebum in the ducts of the sebaceous glands and hair follicles.

Acne punctata occurs in two forms, differing in color, which are therefore respectively called nigra and alba, but are usually known as comedo and milium.

Symptoms.—Comedones usually occur between the ages of fourteen and twenty-five, and attack the face, chest, and back, in small black spots, which look, as Hebra suggests, like grains of gunpowder inserted into the skin. If one of these black spots be compressed between the nails, a long, wormlike body with a black head is forced out. The little mass thus ejected consists of retained sebum and the black head of dirt which has adhered to the cheesy material. The cavity from which the wormlike body is expressed is the neck of a hair follicle into which a sebaceous gland opens, and the wormlike appearance is caused by its shape. In the substance of the mass there is also, however, in some cases a living grub, which has nothing to do with the retention of the sebum, and is quite as often found in normal glands. It is called the acarus folliculorum, and was first discovered by Henle in 1841.

Milium appears in the same situations as comedones, and at the same time of life, but often terminates in an inflammatory process, giving rise to acne vulgaris. It consists of a small swelling under the cuticle, which is caused by the retention of sebum in the sebaceous gland and not in the neck of the hair follicle, and is white in color, owing to the impossibility of accumulating dirt, as in the comedones.

Diagnosis.—These varieties of acne punctata can only be mistaken for acne vulgaris, but the absence of redness and other inflammatory signs in them is sufficiently characteristic.

Prognosis.—It is perfectly harmless and easy to cure, but is liable to recur.

Treatment.—For comedones thorough cleanliness and friction of the part affected is the best treatment. The plugs of sebum should be squeezed out by the finger nails or with a watch key, and a mild stimulating ointment containing a small quantity of sulphur or tar should be afterwards applied. The skin over the little tumors in milium should be carefully divided and the mass squeezed out. Constitutional remedies are necessary in both conditions if any functional irregularity can be discovered.—MALCOLM MORRIS.

ACNE ROSACEA.—*Definition.*—A disease of the skin occurring on the face, and characterized by great hyperæmia of the part and dilatation of the vessels, accompanied by hypertrophy of the fibrous elements and of the glands, which sometimes leads to the production of tumors.

Symptoms.—A. rosacea is believed to be to some extent hereditary, and is certainly due to some condition affecting the general health. Indigestion, produced by excess of food or strong drinks, causes flushing of the face, which often terminates in this disease, and in women irregularities of menstruation must also be mentioned. It may appear at any time except during childhood, but generally in middle or advanced life.

A. rosacea is not in itself a disease of the sebaceous glands, although they are frequently among the tissues affected. It is always limited to the face, and attacks in preference the nose, cheeks, forehead and chin. It commences by an injection of the bloodvessels, leading to a reddening of the skin, which fades on pressure, and is increased greatly after a meal or on exposure to cold. This hyperæmia of the part produces a burning or tingling sensation. The disease may stop at this stage or may be associated with other morbid changes, but when these are absent the nose is usually alone affected. With the reddening there may be a considerable increase in the amount of sebum secreted, which gives the part a very greasy appearance, or the sebaceous glands may be inflamed and filled with secretion, and their ducts remain open. At a later stage round nodules form, and great hypertrophy of the part takes place, which, when the nose is attacked, causes great deformity. The nodules may be of varying shape and size, and sometimes hang from the nose in pendulous masses.

The disease may persist or the redness may fade, and the tubercles either become absorbed or drop off, but extensive suppuration and ulceration never occurs.

Diagnosis.—A. rosacea has to be distinguished from A. vulgaris, lupus erythematosus, and on the nose from frostbite.

From the first it may be recognized by the limitation of A. rosacea to the face, while A. vulgaris attacks the chest and back, and also because the inflammation in the former affects the skin between the acne spots, and causes a tingling sensation.

From lupus erythematosus A. rosacea can be distinguished by the absence of ulceration, and of the scabs which are present in the former.

From frostbite the early stage of A. rosacea is also distinguished by the amount of swelling, and the dark-purple, shining appearance in frostbite contrasts with the bright-red and greasy appearance in A. rosacea.

Prognosis.—It is never fatal, but is very obstinate, lasting sometimes for life.

Treatment.—Regulation of the diet, and, when necessary, of the menses, should be attended to before any good result can be expected from local treatment. The inunction of sulphur or iodide of sulphur ointment, the application of a weak solution of perchloride of mercury, or lightly touching the spots with acid nitrate of mercury, are the best forms of local treatment, but three or four days must frequently be allowed to intervene in order that the inflammation excited by this treatment may have time to subside.

In the more severe form the local hyperæmia is relieved by frequent multiple linear scarifications, and when any great deformity exists, the complete removal of the tubercular excrescence is desirable.—MALCOLM MORRIS.

ACNE SEBACEA.—*Definition.*—A condition due to increased secretion of the sebaceous glands, in which the sebum mixed with dirt accumulates on otherwise healthy skin.

Before describing the different varieties of seborrhœa it will be well to discuss briefly the composition of sebum and how it is produced. Kolliker shows that the sebaceous glands are constantly giving off cells, which, when first formed at the bottom of the glands, are pale and only slightly granular, but which, when they are forced to the surface by the formation of fresh cells, become filled with a quantity of fat-granules. These granules at a later stage coalesce into a single globule, and the wall of the cell becomes stronger and more horny. Seborrhœa consists in the increased production of these oil-globules, and may be divided into three varieties —S. oleosa, S. sicca, and ichthyosis sebacea neonatorum.

Symptoms.—Seborrhœa oleosa occurs usually between the ages of fifteen and twenty-five, and effects the cheeks, nose, and forehead. The exudation of oil from the sebaceous glands gives a greasy appearance to the skin, which next becomes dirty, owing to the liability of the oil to attract and absorb particles of dust and dirt floating in the air. When this condition has lasted for some time crusts are formed, which may vary greatly in color, and when they are raised small processes of sebum can be drawn from the follicles. When the disease occurs on hairy places the hair becomes matted, in consequence of which dirt adheres and vermin accumulate, constituting the condition known as plica Polonica.

S. oleosa also occurs on the genitals of both sexes, and is known as smegma præputii et clitoridis. When neglected it forms thin crusts, which in the male are situated on the glans penis beneath the prepuce, and in the female around the clitoris and in the neighboring grooves. If allowed to remain untouched for a long time, they cause severe local irritation and inflammation, a condition which may be mistaken for gonorrhœa. Vernix caseosa is a name given by Hebra to a similar deposit over the whole body of new-born infants.

Seborrhœa sicca is produced in a similar way to S. oleosa, but gives rise to the formation either of a dry, light-yellow crust or a branny coating to the skin. The regions most usually affected are the scalp and other hairy parts of the body. Scales of epidermis are dried sebum, which are constantly being formed and ought to be removed, are, owing to a want of cleanliness, allowed to accumulate in the hair, and is known as scurf. The affection does not last long without injuring the hair itself, which gradually falls off and is replaced by badly developed hair till partial baldness is the result. When the disease is of long standing further changes take place in the scalp, and itching, which is absent in the earlier stage of the disease, may eventually arise from an eczematous condition of the skin.

Ichthyosis sebacea neonatorum must not on account of its name be confused with true ichthyosis, but Hebra has thus termed the affection of new-born infants formerly known as ichthyosis congenita. The symptoms appear within a few hours of birth, when the skin presents a smooth, glossy, and somewhat purple appearance. It is also covered with a quantity of fissures, which are most numerous on the fingers and toes and over the flexures of the joints. The slightest movement causes pain, and in severe cases the child is unable to suck.

Diagnosis.—S. oleosa may be mistaken for lupus erythematosus, but greater swelling and redness, more adherent scales, and a tendency to scar are found in the latter.

S. sicca may be mistaken for three diseases when it attacks the scalp,—eczema, psoriasis, and ringworm. For the diagnosis from the two former see those diseases. From ringworm it may be distinguished by the history of the case, the absence of short broken hairs, the greater difficulty in extracting the hairs, and by aid of the microscope.

Ichthyosis sebacea neonatorum may be distinguished from genuine ichthyosis by the fact that the former is local and not general.

Prognosis.—This depends on the cause of the condition, for when it occurs in the course of a serious disease the prognosis is unfavorable, while under suitable treatment recovery is in ordinary cases usually rapid.

Treatment.—Both local and constitutional means are used, but the former are the most important. In all varieties thorough cleanliness is necessary, and if crusts are formed they should be removed with oil, soft soap, or lard. After removal of the crusts the part should be dressed with a slightly stimulating ointment, such as zinc, weak carbolic acid or tar, and in S. sicca of the scalp a lotion of borax is useful.

Internally tonics, such as arsenic, iron, and the mineral acids, should be administered in full and repeated doses.—MALCOLM MORRIS.

ACNE SYCOSIS.—*Definition.*—Hebra's definition is "a disease of chronic course, non-contagious, attacking the hairy parts of the cutaneous surface, and characterized by the development of papules and tubercles, continuous thickenings, and pustules of various sizes, all of these having invariably hairs passing through them."

Symptoms.—Acne sycosis consists of a chronic inflammation and suppuration of the hair follicles, and therefore attacks only the hairy parts of the body, *but the most usual site is the beard.* The cause often suggested *for A. sycosis is the use of blunt razors,* but this is doubtful, since persons who never shave are liable to it. The pimples first appear like those of A. vulgaris, but with a hair passing through each of them, and as they get larger and assume the character of tubercles they may coalesce and form a thick, indurated mass, limited entirely to the hairy region and through which the hairs protrude. These hairs are easily extracted on account of the inflammation at their root, which itself appears swollen. From the indurated mass pus oozes, which dries and forms thin yellow scabs, and when the eruption disappears cicatrices are left and the place remains bald. The disease is specially liable to follow attacks of eczema.

Diagnosis.—A. sycosis may be mistaken for A. vulgaris, eczema, or a syphilide. From them it may be distinguished because it always attacks the hairy parts alone, and does not spread beyond them, because the hairs pierce the pustules or tubercles, and no similar eruptions are seen elsewhere.

Prognosis.—The course is always tedious and the disease is difficult to cure, but it rarely terminates fatally unless erysipelas occurs as well.

Treatment.—This consists, in the first place, in epilating the hairs of the diseased parts and in shaving the rest of the patch, but to be of real service epilation should be commenced as early as possible in the attack and should be continued as it spreads. The pustules should be pricked and the pus let out, and if the part is not very painful or inflamed they should be lightly touched with acid nitrate of mercury, but if it is tender cold-water rags covered with oil silk should be applied. As the disease becomes more chronic ointments and lotions similar to those recommended in A. vulgaris should be tried. Hebra strongly insists on the importance of regular shaving after the disease has been cured, to prevent its recurrence.—MALCOLM MORRIS.

ACNE VULGARIS.—*Definition.*—Acne vulgaris is a disease of the skin characterized by the appearance of nodules or pustules, caused by inflammation of the hair follicles and sebaceous glands.

Symptoms.—It occurs in the same places as A. punctata and at the same time of life. It consists of comedones, which by their presence or by local irritation lead to an inflammatory condition of the gland, producing raised red pimples, varying in size from a small seed to a pea. The disease is termed A. indurata if the inflammation extends deeply into the skin, and A. pustulosa if pus is formed. In the latter, after the pustule bursts or the retained matter is expelled, the spot disappears, but a small shallow scar is left. If the disease attacks the forehead it is termed A. frontalis, and appears in the form of large papules, tubercles, or pustules, which leave scars when they are cured. At times, if the inflammation is severe, the disease resembles a boil. A severe form of A. vulgaris is produced by the local application of tar, and by the internal administration to susceptible persons of such drugs as iodide and bromide of potassium. The usual theories as to the cause of A. vulgaris—excessive venery, or the too free use of alcohol or highly seasoned food—are very doubtful, and its true cause is a matter of uncertainty. However, it is common in the scrofulous and tubercular diathesis.

Diagnosis.—Acne vulgaris is easily recognizable, but may be mistaken for small-pox in a certain stage (see Small Pox) or for a syphilide. In the latter case some other syphilitic eruption at the same time is generally to be found (see Syphilitis).

Prognosis.—Acne vulgaris is never fatal, though it produces great annoyance to the individual, and in time the disease will disappear, for it rarely persists after twenty-five or twenty-six years of age.

Treatment.—The treatment should be both local and constitutional. Thorough sponging with hot water and friction are of the greatest importance. The plugs of sebum should be removed by pressure, and the pus liberated by small incisions. Soaps containing free alkali are of value, and Hebra's spiritus saponatus alkalinus is one of the best forms. The part should be well rubbed with it, but its use should not be prolonged over more than a few days on account of the great irritation liable to be produced. It is well also to apply ointments containing a small quantity of sulphur and creasote, such as

Sublimed sulphur	grs. xxx.
White precipitate	grs. x.
Æthiops mineral	grs. x.
Olive oil	ʒ ij.
Creasote	♏iv.
Lard, to	ʒ ix.

-Skin Hospital;

or lotions containiog perchloride of mercury gr. ¼ or ½ to the ℥ j. While the pustules are forming it is well to touch them lightly with acid nitrate of mercury, taking care that the fluid does not run on to the sound skin.

The constitutional treatment should consist of such remedies as are calculated to maintain the general health by regulating the various functions of the body. The diet should be carefully attended to, and stimulants should be prohibited.—MALCOLM MORRIS.

ACUPRESSURE.—Four chief modes; 1, a long needle is thrust right through flap and made to bridge over artery; 2, a short needle with a twisted wire through eye to extract it by, is thrust into soft tissues on each side of and made to bridge over artery; 3, the vessel is compressed between a needle and a loop of wire, like the common hair-lip suture; 4, needle is thrust through soft tissues beside artery, then twisted down upon the artery through an arc of a circle, and thrust into the neighboring soft tissues again. *Advantages* of acupressure.—No foreign body is left in wound more than a day or two, as, after that time, the needles are removed. A few hours suffice for small arteries. Acupressure does capitally in scalp-wounds and when varicose veins burst. *Vide* Sir Pirrie's and Sir James Simpson's writings.—C. B. KEETLEY.

ACROMION, Fracture of—*See Fractures.*

ACUTE GOUT.—*Definition.*—A specific febrile disorder, characterized by non-suppurative inflammation, with considerable redness of certain joints, chiefly of the hands and feet, and (especially in the first attack) of the great toe; attended by excess of uric acid in the blood, and probably also of phosphoric acid. The constitutional affection tends to culminate, at longer or shorter intervals, in a paroxysm or "fit of the gout," when various joints, textures or parts of the body are apt to become affected.

Causes.—Predisposing causes are heredity and sex. The immediate exciting causes are very much similar to those of rheumatism, but may not always be obvious as regards any particular attack; which may be set up by excessive fatigue of body or mind, or both; by violent or depressing emotions, grief, rage, fear; by over-eating and drinking, and especially by indulgence in indigestible food.

Symptoms.—These vary according as the disease attacks the joints—regular or articular gout; or some internal organs, such as the heart, the stomach or intestinal canal—irregular or misplaced gout. The functions of digestion, and especially the hepatic and urinary secretions, are much deranged in all cases of gouty paroxysms. Besides loss of appetite, flatulence, heartburn, stomach-ache, or colicky pains prevail, the tongue is loaded, and the bowels are bound. Air and impacted fæces distend the intestine, especially in the epigastric and umbilical region. The hypochondriac regions, especially the right, are the seat of painful tension and uneasiness. The first alvine dejections are generally solid and dark-colored, not unfrequently very fœtid, and in some instances large quantities of dark-colored excrement are brought away. The urine, when scanty and of a deep red color, is voided with pain or a scalding along the urethra. The sediment already mentioned and soluble in water is rose-colored, and is deposited during the whole course of the attack. The fit is accompanied throughout with loss of appetite and chilliness of the whole body toward the evening. Marked remissions are usual toward morning. After the paroxysm the water is usually copious, and the uric acid increases as the fit is passing off. Before paroxysm there is a diminution of all the chief ingredients of the urine. During the paroxysm there is insufficient elimination of uric and phosphoric acids. When the fit is going off a violent itching seizes the foot, especially between the toes, and the skin peels off.

Prognosis.—A few persons may reach advanced age notwithstanding repeated attacks of gout. Yet many die prematurely, especially from renal disease, while it materially diminishes the chances of recovery from acute diseases and severe injuries.

Treatment.—Seeing that the disease is clearly of constitutional origin, its treatment resolves itself into : (1st.) The selection and administration of those remedies which shall tend to subdue, control or eradicate the latent disposition, constitutional tendency or gouty diathesis. (2d.) The adoption of such means as may be safely used to modify the severity of or shorten the paroxysms. The paroxysm must be interfered with cautiously. It is the means which nature takes to rid the constitution of the *materies morbi.*

Antiphlogistics neither alleviate the pain of gouty inflammation nor shorten the attack ; while their untimely use, especially general and local bleeding and active saline purges, favors the passage of acute into chronic gout. Rest is absolutely necessary. Warm anodyne lotions or fomentations may be used, and the part afterwards lightly covered or encased in flannel or fine wool, while the limb is at the same time kept elevated.

Tincture of aconite ℥ jss to ℥ iv of milk may be applied by means of linen compresses and frequently renewed. The hypodermic injection of a fourth to a third of a grain of muriate or bimeconate of morphia in any convenient part of the body, often relieves the local pain. When the pain is very intense, relief may be given by the application of a solution of atropine made by dissolving from two to three grains of the alkaloid in a weak mixture of spirits and water, and applying it to the inflamed joint by means of compresses of lint, preventing evaporation by a covering of oil silk.

In the general treatment of gout, bleeding is now generally restricted to two methods, namely : (1st.) By leeches to the part where the inflammation rises so high, or is so chronic, as to threaten the patient with the permanent loss of the use of some joint ; and to cases of metastasis of the disease to the stomach or other internal organ, when leeches are absolutely necessary. (2d.) By general blood-letting. But we should never bleed with the idea of directly subduing gouty inflammation ; nor in advanced gout, nor when the constitution is much weakened. If bleeding be required to relieve general or local plethora, abstract only as much as will accomplish that object.

Colchicum in some cases seems to be almost specific in its effects. The wine of the root is generally the form preferred, ten to fifteen or twenty minims being given every four, six or eight hours, and this remedy should be continued in reduced doses for some time after all symptoms of gout have disappeared.

Neutral salts are efficient in relieving gout. The salts most in use are the sulphates of magnesia or soda, especially the former, and half a drachm to a drachm should be given every eight, six or four hours, according to the state of the bowels and the acuteness of the symptoms. It is also necessary to afford some relief to the patient from his excessive suffering.

With that view an anodyne should be added, such as the tincture of hyoscyamus, syrup of poppies, or some preparation of opium.

Abernethy was wont to prescribe the following:

℞	Sodæ phosphatis	
	Sodæ sulphatis	aa ʒ iv;
	Ammon. sesqui-carb.	ʒ ss;
	Acidi benzoici	gr. xx;
	Vin. sem. colchici	ʒ iss;
	Infus. calumbæ ad	℥ viij.

M. Sig.: A sixth part is to be taken every four or six hours.

Dr. Wood is in the habit of using the following formula in a draught:

℞	Magnesiæ	℥ ss,
	Magnes. sulphat	℥ ss;
	Vin. colchici rad.	m xx;
	Aquæ fluid. vel aq. acid. carbon	℥ jss.

B. W. PALMER.

ACUTE RHEUMATISM.—*Definition.*—A specific febrile disorder, due to a morbid state of the system by constitutional development, and expressed by inflammation of a peculiar non-suppurative kind in the fibrous tissues about or surrounding the joints, especially in the white fibrous tissues, such for instance as the sheaths of the muscles, and muscular fibres, tendons, aponeuroses, bursæ, capsular ligaments, periosteum and pericardium. Many joints may be affected at the same time or in succession. The various local phenomena of the disease have a tendency to shift from part to part, the most remote from each other; and the febrile state is accompanied by profuse acid excretions from the skin, by the separation, in some cases, of large quantities of uric and sulphuric acid through the kidneys, and by a highly fibrinous condition of the blood.

Causes.—Cold and wet by lowering the vitality of the part operate as causes. Acute rheumatism is a sequel to certain fevers, as scarlet fever. Atmospheric vicissitudes, errors in diet, suppression of the menses and like disturbances of the functions of life have been assigned as causes.

Symptoms.—Severe inflammation of the feet, hands, or of the larger joints, accompanied by severe inflammatory fever, abnormal sensibility to atmospheric vicissitudes. It is ushered in with a chill succeeded by fever, copious acid perspiration. The urine is scanty, of high specific gravity, deeply pigmented, and deposits on cooling deep colored sediments of urates. It very much resembles pea soup. The pulse rises from 90 to 110, and is large, full and strong. The tongue is loaded with a white or yellowish-white mucus. The bowels are sluggish, the evacuations dark and offensive. The signs of approaching hyperpyrexia are delirium, restlessness, rebelliousness to treatment, tremors, disorderly respiration, stupor, somnolence, deafness, prostration, apathy, waywardness of manner, unnatural anxiety and depression of mind.

Prognosis.—Favorable. The disease is rarely fatal.

Treatment.—A successful treatment in rheumatism means that the attack should be passed through without any permanent organic mischief being left behind. The treatment must provide first, for the acute attack, second for the management of the system as regards those conditions of the life of the patient which may have been found to contribute to the constitutional development of the disease.

In the acute attack we must first protect the patient from pain and exposure to cold air,—especially as regards the joints, and encourage free excretion from the skin and kidneys. The general management of the patient is all important. No linen must touch the skin. A flannel shirt must be worn next its surface and the patient put between soft blankets. This method of wrapping in blankets reduces by a good three-fourths the risk of inflammation of the heart run by patients in rheumatic fever, diminishes the intensity of the inflammation when it does occur, and diminishes still further the danger of death by that or any other lesion. At the same time it does not protract the convalescence. An early high temperature to the skin combined with absolute rest are worth all other means of relief put together. General blood-letting is not to be recommended, and on pathological grounds it is not justifiable. Active purgation also is to be avoided.

The following may be given to secure an abundant flow from the glandular follicles of the intestinal mucous membrane :

℞	Calomel	grs. v.
	Pulv. Jalap. Co	℈ij.
	Pulv. Zingiberis	grs. iij.

Sig.—To be taken in a little milk.

After having obtained one full dejection by this means the subsequent aim should be to obtain merely a single free evacuation every morning, by means of mild salines.

Alkalies and neutral salts may be given in combination with colchicum, full doses of opium and a little antimony.

The alkaline and saline treatment seems the most rational, it restores the balance of the saline ingredients in the blood and controls the tendency to fibrinous deposition.

Salicine, salicylic acid and salicylate of soda have all been recently and largely used in the treatment of acute rheumatism ; given in doses of grs. x–xx at intervals of from one to three hours and in larger doses of grs. xxx every hour. These agents act by reducing the temperature and controlling the rheumatic fever, they are not specifics.

It is now generally accepted as a fact that we have in salicin a valuable remedy in the treatment of acute rheumatism, the more acute the case the more marked the benefit; relief of pain and fall of temperature generally occur simultaneously.

Hyperpyrexia may occur suddenly and rapidly in acute rheumatism. Extreme vigilance must be exercised and the thermometer used assiduously. The only treatment which has succeeded in these cases has been the effectual external application of cold, by the bath, at a temperature of 90° or 95° Fahr. in the first instance and gradually reduced by cold water to 70° or even lower. It is proper to remove the patient from the bath when his temperature has fallen to 102° since there is a subsequent fall of 4° after removal.

The bath may be administered as a simple palliative in all exacerbations of delirium and restlessness.

External topical applications are efficient aids in treatment. Warm anodyne fomentations are always employed with advantage, and of all applications a mixed alkaline and opiate solution applied as a fomentation, is the most powerful in allaying pain. A solution very highly commended for this purpose is the following :

℞	Carbonate of Potash	℥ i.
	Decoction of Poppies	Oj.
	Tincture of Opium	ʒ vj.

If the hands, elbows, knees, or feet are the seat of the inflammation, gloves or caps made of spongiopiline may be made to fit these parts. The spongy surface of this is first moistened freely with water and any superabundant fluid squeezed from it. Nitrate of potash or the salt to be used, in the form of powder, is then freely sprinkled over the moistened surface. It is then applied to the inflamed part and lightly secured by a roller. The sponge surface should be remoistened about once in six hours.

If the skin is hot and dry and is not acting freely, alkaline baths afford comfort and cleanliness. Two pounds of the bicarbonate of potash and one pound of the nitrate of potash are to be dissolved in water at a temperature of 100° Fahr. and this added to a bath at a temperature of 98° Fahr. the patient remaining in the bath not longer than ten minutes.

The diet of the patient in acute rheumatism should be strictly limited to slops, such as arrow-root, beef-tea, milk and lime water, or warm milk to which a little carbonate of soda, nitrate of potash, or bicarbonate of potash is added; light puddings to which sherry or brandy may be added if depression exist, and even in many chronic cases it is desirable to limit the diet to puddings and white fish. To obviate the great drain upon the system it is necessary, however, that the rheumatic patient be better fed than in cases of idiopathic inflammation. Beef-tea and jellies may be given and strong coffee might also be frequently administered.—B. W. PALMER.

ACRODYNIA.—*Definition.*—This is defined by Dunglison to be "a painful affection of the wrists and ankles, especially with an erythematous eruption, which appeared in Paris as an epidemic in 1828–9, supposed by some to be rheumatic, by others to be owing to spinal irritation. It appears to have been the same as Dengue."

ADDISON'S DISEASE.—*Definition.*—Is a chronic caseous degeneration of the supra-renal capsules, attended by a peculiar dark bronzed appearance of the skin and atrophy of the neighboring plexus of nerves.

Morbid Anatomy.—The capsule is swollen, thickened, dark in color, and studded with extravasations of blood. It is firm in consistence, and its surface is irregular. It presents a grayish-white or whitish homogeneous substance, with caseous collections, and calcareous deposits. These caseous masses are composed of débris and cellular elements in a state of decay or degeneration; or crystals of cholesterin may often be found. The pigmentary deposit is in the lower layer of the rete Malpighii.

Etiology.—Is unknown. It forms one of the symptoms of general tuberculosis, cancer, and amyloid and fatty degeneration.

Symptoms.—Skin—becomes gradually dark. Roots of the nails remain white. Palms of the hands and soles of the feet are spotted. Sclerotic of the eye—is of a pearly hue. Black spots appear on the mouth and lips. Extreme debility and dementia are often present. Pain—in the back and epigastrium usually exists. Dyspepsia. Vomiting. Diarrhœa—obstinate in character. Epileptic convulsions—may occur in some cases. Temperature—usually normal. Heart-beat and pulse—at first accelerated, but, toward the end, become weak and feeble. Death.

Treatment.—Good nourishment and care is all that can be suggested, as it usually terminates in death in about four years at the most.—H. C. MOIR.

ADENOCELE. ADENOMA. ADENOMATA.—A growth, the whole or part of whose structure resembles that of some gland. (But the term "Lymphoma" is usually applied to any tumor resembling lymphatic gland.) When not pure these tumors are called Adeno-sarcoma, Adeno-myxoma, &c. *Occurrence.*—In the "mucous polypi" of the nose, rectum, and uterus: vide *Polypi;* in thyroid gland: vide *Bronchocele;* in parotid, lips, tonsils, and skin. *Physical Character:* movable, rounded, ovoid, or lobulated. Growth, variable in rapidity. *Treatment.*—Divide capsule and enucleate in suitable cases. Also refer to articles *Polypi*, *Bronchocele*, *Breast Tumor*, *&c.*—C. B. KEETLEY.

AGORAPHOBIA—*See Fear, Morbid.*

AGUE—*See Malaria.*

AGUE, BROW—*See Neuralgia.*

LBINISM. ALBINISMUS.—*Definition.*—Albinismus is a con- ital absence of pigment from the skin, hair, iris, and choroid, which y be either general or local.

Persons suffering from general deficiency or absence of pigment are termed albinos.

Symptoms.—In albinos the skin is dull white and of delicate texture, the hair is fine and yellowish or white, the iris is pink, and the choroid being devoid of the normal dark pigment, the pupil appears red instead of black. Persons thus affected are stated to be usually of delicate health, and their skins are more prone to suffer from exposure to heat and cold.

The affection is more frequently met with in the tropics, and is more noticed in the dark races.

In the partial form of the disease patches resembling leucoderma are found scattered about the body, giving the person, if dark, a piebald appearance.

Morbid Anatomy.—Microscopic examination of the skin of albinos shows absence of the normal pigment from the deeper rete cells.

Treatment.—No treatment is of any avail.—MALCOLM MORRIS.

ALBUMINURIA—*See Urine, Abnormal Conditions*

ALCOHOLISM.—*Etiology.*—The injurious effects produced upon the system by the abuse of alcohol are but too well known. They are the result of its direct irritant action; of its influence on the vasomotor nerves; of the circulation of its own poisonous elements, or of those derived from its decomposition, through the various organs and tissues; and of its interference with tissue metamorphosis, oxygenation, and nutrition. The exact effects will depend on the nature, quantity, and the strength of the stimulant indulged in. Spirits do by far the greatest harm, especially when taken in frequent drams, strong, and on an empty stomach. Alcoholism is most frequent in males, and in those who from their occupation are exposed to intemperance, such as draymen, potmen, or cabmen, or whose calling is a lonely or a sedentary one. It is also predisposed to by various conditions which depress the nervous energy, such as working or sleeping in a hot and vitiated atmosphere, excessive mental work, anxiety or worry, or excessive venery. Persons who suffer severe pain and hysterical individuals are very likely subjects to drink to excess. In not a few instances there seems to be a hereditary tendency to alcoholism, or to some neurosis, such as epilepsy or mania.

Symptoms.—Cases of alcoholism may be included under the following groups: 1. Acute alcoholic poisoning, the symptoms being those of narcotic poisoning. 2. Delirium tremens. 3. Chronic alcoholism. 4. Acute mania, in which the patient is extremely violent and dangerous, and has a fixed delusion. 5. Acute melancholia, with suicidal tendency. 6. Oinomania, where there is a constant craving for drink, which breaks out at intervals into an uncontrollable propensity, the moral sense being entirely deadened, so that the subjects of this condition will do anything in order to obtain drink. Only delirium tremens and chronic alcoholism can be specially considered here.

DELIRIUM TREMENS.—This condition may come on under the following circumstances: 1. From mere excessive drinking in a temperate person. 2. An individual who is accustomed to drink freely gets very drunk. 3. A habitual tippler, who without being actually drunk is always more or less fuddled from saturation with alcohol, experiences some slight disturbance, especially of a traumatic kind; or delirium tremens may arise in such person even without any apparent cause. 4. From deprivation of proper food, with moderate indulgence in stimulants. 5. In consequence of suddenly cutting off the supply of stimulants from an individual who has been accustomed to drink freely, especially if old or debilitated. 6. As the result of inhalation of fumes from a distillery, it is said (?). Most cases of delirium tremens follow abuse of spirits.

Generally delirium tremens is preceded by premonitory indications, especially disturbed sleep or absolute insomnia, general discomfort and feebleness, agitation and tremulousness, mental confusion and inability to fix the attention, timidity and lowness of spirits. The alimentary canal is commonly disordered, as evidenced by anorexia, foul tongue and breath, unpleasant taste, and constipation with unhealthy stools.

The actual symptoms of delirium tremens are usually very characteristic. The patient is either quite sleepless, or only obtains short uneasy dozes. The mind is in a state of general confusion, restlessness, and excitement, and though it may be possible to attract the attention of the patient for a moment, and to obtain a sensible answer to a question, he speedily wanders off and talks ramblingly and incoherently, there being a kind of busy delirium. A variety of mental delusions, illusions, and hallucinations usually exist, the patient fancying he sees or hears all sorts of objects and sounds, often of a hideous character; or distorting in his imagination what he does see and hear into strange and horrible forms and noises. These delusions are generally transient and changeable, but occasionally the patient fixes upon one, and reasons about it. Further, the mental condition is one of combined irritability, marked cowardice, sense of dread, and suspicion. The patient has an anxious, wandering expression, and looks upon everybody around with terror and distrust, imagining that they are trying to poison or otherwise injure him; or fears lest he may do an injury to himself, and has a great sense of alarm as to what is going to happen. These feelings may culminate in fits of violent mania, attended with extreme muscular effort and a wild expression, the patient trying to injure those around, to jump out of the window, or to do various other acts with the view of escaping from some imaginary enemy. There is usually no complaint with reference to the head. Creeping sensations over the skin and other paræsthesiæ are common, and the patient often fancies he sees or feels horrible insects crawling over him. The prominent symptoms connected with the muscular system are restlessness, carphology and general tremors, and latter being especially observed in the hands and tongue. After fits of violence the patient is much exhausted and prostrated. The pupils are generally dilated and sluggish.

The important extrinsic symptoms in delirium tremens are profuse perspiration without fever, the sweat having often a very disagreeable smell, the skin feeling moist and clammy, especially that of the palms, or being even drenched; a weak, large and soft, or small and frequent pulse, the sphygmographic tracing often exhibiting marked dicrotism; and disorder of the alimentary canal, as indicated by foulness of the mouth and tongue, which are covered with sticky mucus, peculiarly unpleasant breath, complete loss of appetite, much thirst, nausea, but rarely vomiting, and constipation with offensive stools; the urine is sometimes much diminished in quantity, and is deficient in phosphates and urea, but often deposits urates on standing.

Recovery is in many cases preceded by restoration of sleep, but this by no means necessarily leads to a favorable termination. In fatal cases typhoid symptoms frequently set in, with a dry brown tongue, sordes on the teeth, and low nervous phenomena, such as muttering delirium, epileptiform convulsions, and coma. Pneumonia or some other inflammatory complication may arise. Sometimes death results from sudden collapse.

CHRONIC ALCOHOLISM.—Various grades of this condition are to be constantly seen, *especially in hospital practice.* A very able description of the phenomena observed has been given by Anstie. The ordinary signs may be summed up as follows: 1. *Nervous phenomena.* These include muscular restlessness and fidgetiness, culminating in tremors, beginning in the limbs, at first slight and controlled by an effort of the will, but afterwards becoming more marked and constant, being worse in the mornings, and then diminished by food and drink; insomnia, or very disturbed and unrefreshing sleep with horrible dreams; diffused dull pain or heaviness in the head, and sudden attacks of vertigo; disorder of the special senses, as evidenced by photopsia or muscæ volitantes, and noises in the ears; mental disturbance, indicated in the early period by mental disquietude, uncertainty of purpose and inability to fix the attention upon anything, indecision of character, a vague sense of dread, or fits of violent temper; later on by impairment of the mental faculties, in some cases very marked, the patient having horrible visions or delusions as to people plotting his ruin, and exhibiting great cowardice with loss of moral power, and a particular tendency to tell falsehoods about drink; impairment of muscular co-ordination, which explains the sensation sometimes experienced by the patient, as if he were going to fall down a precipice when walking on firm ground. 2. *General appearance.*—The signs coming under this head are more or less obesity or emaciation, the former being chiefly observed in beer-drinkers, the latter, which may be extreme, in spirit-drinkers; flabbiness or a bloated aspect of the features, with red and watery eyes, yellowness of the conjunctiva from fat and jaundice, and often redness of the face with enlarged vessels, especially about the nose and cheeks, or acne. 3. *Disorder of the alimentary canal,* indicated by total anorexia or disgust for food, especially in the mornings, the patient often making this an excuse for taking stimulants, in order to "keep up" the system; thick dirty furring of the tongue as a rule, but not always; dryness and cracking of the lips; catarrh of the pharynx; peculiar and disgusting foulness of the breath; severe morning nausea or actual sickness; irregularity of the bowels, with fetid stools; and occasionally serious hæmorrhage from the stomach or bowels. 4. Symptoms due to organic visceral changes and to degenerations. These have been pointed out in previous chapters, and, as already stated, there is much difference of opinion as to the influence of alcohol in their production. There can be no doubt as to the direct effect of strong spirits upon the mucous membrane of the alimentary canal, and especially upon that of the stomach, these inducing congestion, chronic inflammation, fibroid changes, and glandular degeneration; or that alcoholic abuse tends to lead to fibroid and fatty degeneration, with atrophy of various organs and tissues, including the nerve-centres.

In very advanced cases of chronic alcoholism still more grave nervous symptoms are met with, such as absolute dementia, marked sensory paralysis in different parts, extreme muscular trembling simulating paralysis agitans, general muscular weakness, paralysis or ataxia, epileptiform attacks, or finally coma. Such phenomena are necessarily attended with serious organic changes in the nervous system.

Diagnosis.—Delirium tremens has to be mainly distinguished from acute mania or meningitis. The history of the patient, and the circumstances under which the affection occurs; the characters of the the nervous and extrinsic symptoms; and the absence of any fixed delusion, generally leave no doubt as to the nature the case. Sometimes acute alcoholism closely simulates low feveir. Chronic alcoholism should always be suspected if any of the symptoms mentioned are complained of, not forgetting digestive disorders, but especially should there be morning sickness, insomnia, fidgetiness or tremors, mental restlessness, or disturbance of the special senses. Close inquiry is often needed in order to elicit a history of intemperance in these cases, many patients trying to conceal their evil habits in every possible way. Anstie enumerates the following nervous diseases as being particularly liable to be simulated by chronic alcoholism, viz., commencing general paralysis of the insane, paralysis agitans, lead-poisoning, locomotor ataxy, softening of the brain or cord, epilepsy, senile dementia, hysteria, and the nervous malaise associated with some forms of dyspepsia.

Prognosis.—Delirium tremens usually terminates favorably. The chief unfavorable circumstances are: A history of chronic indulgence in excess of alcohol, so that the system is more or less saturated; the patient being advanced in years, enfeebled in constitution, or suffering from organic visceral disease, especially disease of the kidneys; a history of previous attacks, particularly if they have been numerous; difficulty in getting nourishment into the system, either from the patient refusing food or from assimilation being impaired; inability to procure sleep before the patient is much exhausted; an unfavorable condition of the pulse, as evidenced by the sphygmograph; the occurrence of typhoid or low nervous symptoms; and the development of inflammatory complications, especially pneumonia. In the early period chronic alcoholism can always be cured if patients will keep away from drink, but it is often a very difficult matter to get them to do this. When serious nervous symptoms have become developed, there is but little hope of improvement.

Treatment.—Delirium Tremens.—1. In treating delirium tremens, the first object aimed at should be to withdraw or to reduce the quantity of all forms of alcoholic stimulant, so far as this is practicable, but especially of spirits and wine. In a large proportion of cases it has been found that no harm whatever results from cutting off stimulants completely, especially in young patients, and in first attacks; in others they must be moderated as much as possible, being chiefly needed if the patient is a habitual drunkard, old, or feeble, or if there are signs of adynamia. It is well to keep to malt liquors, if it can be managed, but brandy may be required. At the same time it is highly important to introduce as much nourishment as possible into the system. Strong beef tea, beef juice, hot soups, milk, eggs beaten up, and other forms of nutritious foods which are readily assimilated, must be given at frequent intervals, by night as well as by day. If the patient refuses food, white of egg mixed with iced water is useful, and nutrient enemata must be regularly employed. In the treatment of strong patients, especially if they are young and a large quantity of spirits has been taken, a brisk watery purgative is decidedly beneficial at the outset, but this is not advisable in all cases.

2. The next indication is to endeavor to procure sleep before the patient is exhausted. For this purpose certain drugs are most useful when employed in moderate doses, especially opium or morphia, the latter being best introduced by hypodermic injection (gr. ⅛ to ½); hydrate of chloral (gr. xx every hour or two); bromide of potassium (gr. xx every two hours); and extract or tincture of cannibis indica. As a general rule I quite agree with Anstie and others in opposing the notion that "patients in delirium tremens require to be narcotized into a state of repose," but I have met with cases in which the only chance of recovery seemed to be in procuring sleep at any risk, and where the administration of considerable doses of morphia, combined with abundant nourishment, proved, I believe, the means of saving life. Other remedies employed in the treatment of delirium tremens are tincture of digitalis in large doses (ʒ ij to ℥ every four hours), originally introduced by Mr. Jones, of Jersey; capsicum, in the form of powder or tincture in full doses; tartar emetic in sthenic cases attended with wild delirium; and chloroform, either by inhalation or internally. Chloroform inhalation carefully employed may be decidedly serviceable sometimes.

3. *Symptoms* often require attention in acute alcoholism, especially vomiting. Should there be adynamic signs, stimulants must be given, such as ammonia, ether, musk, or camphor, along with brandy. Complications may also call for interference, particularly pneumonia, which always needs a supporting treatment in these cases. A patient suffering from delirium tremens should be placed in a comfortable and well-ventilated room, kept perfectly quiet and apart from friends, only one or two trained attendants being permitted to be present, according as the patient is peaceable or violent, treated kindly but with firmness, and constantly watched, lest he should injure himself. Mechanical restraint, such as that by means of the strait-waistcoat, is but rarely admissible, though it is needed now and then in cases of extreme violence.

CHRONIC ALCOHOLISM.—In treating chronic alcoholism, there should in most cases be no hesitation in forbidding stimulants entirely, but especially spirits or wine. It is often, however, difficult to persuade patients to carry out this advice. A glass of good bitter ale or stout along with food may be useful in some instances, and Anstie recommended the latter at night in order to procure sleep. It is most important to induce the patient to take nourishment, and there is generally a great distaste for food small quantities of milk, concentrated beef tea, soups, or meat juices should be given at frequent intervals. It is wonderful, however, how soon the appetite returns in many of these cases when the intemperate habits are relinquished. If there is much sickness, an effervescent mixtute may be given, or soda-water with milk. I have found a mixture containing bicarbonate of soda or nitro-muriatic acid with infusion of gentian and hydrocyanic acid—m iij–iv, very serviceable in many cases. Anstie recommended one or two grains of quinine twice or thrice daily. Marcet found oxide of zinc useful, beginning with gr. ij twice daily, and gradually increasing the dose. Others have much faith in tincture of capsicum. If there is much restlessness and sleeplessness, a full dose of bromide of potassium at night will generally procure sleep, or this drug may be given more frequently if necessary. Some practitioners prefer subcutaneous injection of morphia, hydrate of chloral, extract of cannabis indica, or a full dose of sulphuric ether. Baths are often serviceable in chronic alcoholism; and rest from occupation, with change of air, aids recovery materially. The bowels should be kept well opened.

In advanced cases the treatment must be varied according to the prominent symptoms present. Anstie found the long-continued use of good doses of cod-liver oil most beneficial, with hypophosphite of soda or lime if there is commencing paralysis of sensation, bromide of potassium should there be epileptiform convulsions, and very minute doses of strychnine when marked muscular tremor is observed.—FREDERICK T. ROBERTS.

ALOPECIA.—Deficient growth of hair may either be congenital or acquired. The former is rare, and in it the hair is scanty and downy, or entirely absent from the scalp, but usually after a time the growth may become normal. Acquired baldness may result either as a senile change, when it is often preceded by grayness of the hair with more or less atrophy of the skin, sebaceous glands, and hair follicles, or at a comparatively early period as a sequel of one of the acute diseases, such as scarlatina, erysipelas, etc., or as a result of a local inflammatory process which affects the hair follicles and papillæ, as in acute or chronic eczema, psoriasis, syphilis, favus, ringworm, etc.

In alopecia senilis the skin, hair follicles, and glands are diminished in size and wasted, and only fine lanuginous hairs are produced. The change is a permanent one and not amenable to treatment.

In premature alopecia, resulting from acute diseases, the baldness is usually temporary. In eczema, psoriasis, and other affections the shedding of the hair is analogous to the desquamation of the cuticle from the inflamed skin, and unless the inflammation has been sufficiently severe to destroy the hair papillæ, new hair, at first downy and afterwards normal, is reproduced. But where the follicles and papillæ have been destroyed by suppuration and ulceration the baldness is permanent, and no treatment is of any avail. For the loss of hair after fever tonics, generous diet, and a local stimulating lotion containing cantharides are the proper measures to be relied upon.

ALOPECIA AREATA.—*Definition.*—An atrophic disease characterized by the sudden loss of hair in small roundish limited patches, which have a tendency to enlarge slowly.

Symptoms.—The disease begins on the head or beard by the sudden loss of hair on a limited area. The hair comes out easily, and shows no signs of brittleness or any morbid charge. Usually there is no sensation to indicate the position of the disease. The patches from which the hair has fallen are extremely swooth, white, and glistening, or polished like a billiard ball, and on the same level with or slightly more depressed than the adjacent skin. The patches are most common on the scalp, but may occur on the eyebrows, cheeks, or other hairy parts of the body; they are sharply limited and surrounded by healthy hair, growing luxuriantly. As the disease spreads the hairs at the margin of the patch become loose and easily fall out, and thus by the confluence of patches large irregular areæ are formed. After a time the disease becomes spontaneously arrested, the smooth shiny skin becomes marked by little prominences corresponding to the hair follicles, and thin hairs, at first white and downy, but afterwards stronger and darker, are slowly reproduced. In rare instances the hair never grows again, or only as fine, pale, or downy threads.

Diagnosis.—The alopecia areata are sometimes mistaken for tinea tonsurans, but the differences between the two diseases are so marked that the diagnosis is easy. In tinea tonsurans the patches are rarely bald, but are covered with short stubby hair, which comes out easily and under the microscope shows the fungoid character of the disease. The patches are also scaly, contrasting strongly with the perfectly smooth shiny patches of alopecia areata.

Prognosis.—The disease, arising suddenly, like zoster and morphœa, runs a definite though prolonged course, and tends to spontaneous recovery. It is probably a neurosis, and due to some nutritive lesion affecting the formation and growth of the hair. The occasional occurrence of alopecia areata on neuralgic patches is a fact somewhat in favor of this view.

Treatment.—The spreading of the disease can sometimes be arrested, and the new growth of hair encouraged by severe blistering with acetum cantharidis or Bur's vesicating fluid. The blistering should be repeated every fortnight. Internally iron, strychine, arsenic, and other nervine tonics are said to be of value; at all events they should be tried in conjunction with local stimulation.—MALCOLM MORRIS.

AMAUROSIS.—*Natural History.*—This affection is characterized by certain organic changes in the optic nerve and retina, or other parts of the nervous system essential to vision, causing an inability to perceive objects which lie in certain portions of the visual field, with a distinctness corresponding to the amount of illumination and size of the visual angle In bad cases the objects cannot be seen at all, when the condition is known as Amblyopia; and when light cannot be distinguished from darkness it is known as Amaurosis.

The conditions under which amaurosis has been brought about may best indicate its pathology. These may be summed up under the following heads: (1). Mechanical injuries, solution of continuity or sudden contraction of the space of the optic nerve or retina. Hæmorrhagic extravasations are found which notably break up the nerve-elements, causing them permanently to lose their conductive power. If they are only pressed upon, and no inflammation follow, with progressive absorption of the extravasation, a partial or complete restoration of vision may follow. These extravasations are not unfrequent in the retina as a result of hypertrophy of the left cardiac ventricle, coughing, or lifting heavy weights. Extravasation causing amaurosis has also been found in the optic chiasma. Double amaurosis may result from apoplectic extravasation in the thalamus. (2). Sudden interruption to blood supply, as by embolus, with sudden and marked contraction of some or all the branches of the arteria centralis retinæ. Such a form of amaurosis is oftenest seen in anæmic conditions, as in the later stages of diabetes, albuminuria, syphilis, lead poisoning, uterine hæmorrhages, hæmatemesis; and the blindness is generally in both eyes. (3). The influence of material which poisons the blood and acts upon the brain, or affects the optic nerve and retina, as atropia, acts on the ciliary nerves. The most marked cases of this kind are from uræmia and lead poisoning; opium, Calabar bean, nux vomica, and tobacco. The extreme use of quinine and abuse of alcohol have also been known to produce amaurosis. (4). Congestion and hyperæmia of the eye. (5). Intracranial changes of tissue (cerebral or central amaurosis). In such cases the impairment of vision is generally due to lesion of the optic nerve at the base of the brain, such as gray atrophy; which may not affect any part of the cranial cavity. Basilar meningitis, or periostitic affections of the basilar bones affecting the optic nerves, may induce hemiopia of the same side in both eyes, or total blindness of one or both eyes. Tumors at the base of the brain, involving the nerve directly or by pressure, in or by the morbid growth, are also intracranial causes of amaurosis. They are usually found at the base, especially about the sella turcica and neighborhood of cerebellum. Actual disease of the brain itself may also be a cause, such as encephalitis, abscess, softening, tubercle, gummy tumors, hydatids, hæmorrhages; but their relations to amaurosis are very complicated. Generally they cause amaurosis through exciting meningitis, which, spreading rapidly, extends to the intracranial portion of the optic nerve, or influences the optic cavities.

Thus the causes may be either ocular in the retina, choroid, or optic nerve; or extra-ocular, but orbital; or cerebral, or spinal.

The symptoms vary greatly in each individual case and stage of its course. Impairment of vision is the most prominent symptom, which may be irregularly distributed upon the various parts of the visual field. The field of vision must therefore be carefully and repeatedly examined in all cases of amaurosis; and a record kept from time to time, in order to gain a clear idea as to the amount of impairment of function, and as to the progress of the case. The following points must be especially determined: (*a*). Size of the whole field of vision; (*b*). central acuteness of vision and definition; (*c*). manner in which distinctness of perception diminishes in each sector of the field of vision towards the periphery.

Treatment must vary in accordance with the ascertained cause; and hence we must look to the nature of the several diseases and their management, which are associated with amaurosis.—WILLIAM AITKEN.

AMENORRHŒA.—*Definition.*—Total absence of the catamenia.

Causes.—Pregnancy; occasionally double ovarian tumor; non-development or absence of the ovaries; absence of the uterus; occlusion of the os uteri; occlusion of the vagina; phthisis; during some acute diseases, as pelvic peritonitis and some fevers.

Diagnosis.—Pregnancy confirmed by other signs; double ovarian tumor confirmed by the symptoms and signs of such; in non-development or absence of the ovaries by absence of any catamenial nisus, by non-development of the mammæ and external organs of generation, absence or small quantity of pubic hair, patient retains the figure of a young girl, little or no sexual desire; in absence of the uterus the catamenial nisus may be exhibited by vicarious menstruation: presence of some sexual desire; in occlusion of the os uteri, catamanial nisus exists, and the uterus becomes enlarged and globular from the accumulation of the retained menstrual fluid; in occlusion of the vagina, similar signs, with bulging of the occluding membrane at the vaginal orifice; phthisis, confirmed by other signs.

Prognosis.—According to cause.

Treatment.—Pregnancy may cure of itself. In double ovarian tumor, ovariotomy; in non-development of the ovaries, stimulants to the uterus, as galvanic stem; in absence of the ovaries or uterus, none; in occlusion of the os uteri, puncture at the seat of the os uteri, with slow caretul evacuation of the contents, care being taken by pressure and by the administration of ergot that air is not admitted into the uterus; the frequent use of antiseptic injections; in occlusion of the vagina, free incision into the occluding membrane, with precautions as above; in phthisis, general treatment.—HEYWOOD SMITH.

AMPUTATION (when through a joint it is termed *Disarticulation.*)—*When required.*—For incurable and disabling disease, deformity, or injury of the part; for disease which would take too long time in recovery; to save life when nature would find it easier to heal the amputation wound than to cure the disease or injury, for aneurism below or even above the site of operation; for secondary hæmorrhage.

General Principles.—1, Remove no more of a limb than is necessary; 2, obtain sufficient coverings for the stump; 3, arrange that the cicatrix shall not lie on the end of the bone; 4, do not take hopelessly unsound tissue into the flaps; 5, take every precaution to check hæmorrhage and to prevent its recurrence; 6, cut the large blood-vessels transversely; 7, remember the paramount importance of dressings and after-treatment.

Instruments.—1, Knives appropriate to each case; 2, saw; 3, bone-forceps; 4, lion-forceps; 5, common scalpels; 6, artery-forceps; 7, dissecting-forceps; 8, ligatures; 9, needles and sutures; 10, dressings, sponges, retractors, towels, water, &c.

Assistants.—1, Chief, who sponges, secures arteries, &c., usually stands opposite operator; 2, holds part to be removed; 3, secures main artery, unless tourniquet be used; 4, hands instruments when wanted; 5, chloroformist. Number of assistants of course depends greatly on supply accessible.

Methods.—1, circular; 2, oval; 3, flap; 4, mixed of skin-flaps and circular cut through muscles.

Steps.—1, Divide soft part; 2, saw-bone (avoid splintering, cut off spiculæ); 3, tie vessels and trim soft tissue; 4, adjust flaps and insert sutures; 5, apply first dressings.

CIRCULAR AMPUTATION.—1, Sweep through skin and fat and dissect up for half diameter of limb, turning edge of knife slightly away from skin to avoid scoring the vessels which supply the skin-flap; 2, sweep through muscles, "retracting" all the time; 3, still having the muscles well retracted, one or two inches, and having divided the periosteum by a sweep of the knife, saw through bone. Finish as directed above.

OVAL AMPUTATION.—See amputation of finger at metacarpo-phalangeal joint.

FLAP AMPUTATION.—Three varieties; 1, Double Flap; 2, Rectangular (Teale's); 3, One Long Flap.

Double Flap, may be lateral, antero-posterior, or oblique. Cut thin flaps from without inwards, but thick and fleshy ones by transfixion. Flap containing vessels to be cut last, and vessels cut long.

Rectangular Flaps (*Teale's*).—All the soft tissues down to the bone included in the flaps. Main artery to be in short flap. End of flaps square. Long flap; its length and breadth each equal half the circumference of the limb. Short flap; its length equals one-fourth that of long flap. Bones sawn exactly at angle of union of flaps, without any retraction.

Spence's Operation (a modification of Teale's).—No posterior flap; retraction instead. Anterior flap simply hangs down over bone.

Lister cuts an anterior rounded flap two-thirds diameter of limb in length; skin and enough muscle to cover bone. Posterior rounded flap (one-third limb's diameter), all skin. Posterior muscles cut as short as possible (to free flaps from effects of their contraction). Retract soft parts for two inches, and saw bone.

Single Flap amputation. *Vide* amputation at phalangeal joints of fingers.

Skin Flaps and Circular Incision through Muscles.—Cut two skin-flaps by dissecting from without inwards. Then finish as in circular amputation.

Hæmorrhage during amputation to be prevented temporarily by digital pressure on main artery, by tourniquet, or by Esmarch's bandage.* Afterwards, ligature by silk hemp, or catgut—torsion or acupressure is to be employed. Sponging with cold or with hot water to stop oozing.† Actual cautery to check obstinate bleeding from bone.

Muscles retract greatly in traumatic cases, but very little in limbs affected with old disease. Knife to be used with a free sawing motion. Parts to be relaxed during transfixion. Commence sawing the bone by drawing the saw back to make a groove.

Mortality after Amputation.—Chief causes: 1, shock; 2, secondary hæmorrhage; 3, pyæmia(in nearly half the fatal cases); 4 erysipelas; 5, phlebiti ; 6, congestive pneumonia. Besides which, 7, hospital gangrene; 8, sloughing of stump, and, 9, tetanus, occasionally carry off patient. Pyæmia most common after traumatic, rare after chronic disease cases.

Circumstances affecting Patient's chance of Recovery.—Two classes: 1, constitutional conditions; 2, circumstances of operation itself. Class 1: age, general health, and hygienic conditions. Child's twice as good as a young man's, three times as good as an old man's. Class 2: seat of amputation, structure of bone sawn through; whether amputation is for injury or disease; nature of the affection; time after the injury. Diseased kidneys, town life, amputation high up a limb, amputation for injury, or through much cancellous tissue of bone—all these darken the prognosis. Nature of disease; after chronic disease, prognosis good; malignant or tuberculous disease bad; acute suppurative disease of joints, very bad; amputation of expediency, very bad. Time after injury; primary or secondary. Primary are such as are done within thirty hours of the injury. Secondary are amputations done after suppuration has occurred. Primary always more dangerous than secondary, except in amputations of the upper extremity done in civil practice. Death after primary amputation usually caused by shock, hæmorrhage, or exhaustion; after secondary, by erysipelas, pyæmia, etc.

Amputation at Ankle.—*Pirogoff's.*—Resembles Syme's. But the lower incision extends from one malleolus to the other across the sole of the foot, and inclines forwards and downwards; while the os calcis is sawn through obliquely, downwards and forwards, just behind the articular surfaces for the astragalus. The posterior piece of the os calcis is then placed in apposition with the tibia, whose articular surface is previously sliced off. The resulting stump is longer than Syme's; but if the tarsus is diseased there is a liability to return of the disease in the os calcis.

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* For a *resume* of the advantages of Esmarch's bandage, see *Lond. Med. Rec.* 1874, p. 271.

† See *Practitioner*, Feb. 1879.

Syme's Amputation.—Inner angle of incisions is three-quarters of an inch below and behind inner malleolus; outer angle exactly opposite outer malleolus. Upper incision has an angle of 45° to sole of foot; lower incision inclines downwards and somewhat backwards. Os calcis may be dissected from heel-flap either before or after disarticulation at ankle, *i. e.*, either from below or from above. Syme dissected out os calcis from below, and disarticulated afterwards. Avoid scoring flap. The anterior tibial and both plantar arteries, and not the posterior tibial, are divided.

ARM, AMPUTATION OF.—*Upper Arm.*—Double flap by transfixion often employed. Also circular and mixed operation. Arteries divided: brachial, superior profunda and inferior profunda.

Fore Arm.—In upper and lower thirds prefer skin-flaps and circular through muscles (T. Smith). Arm to be held either supine or midway between supination and pronation. Arteries: radial, ulnar, anterior and posterior interosseous.

Elbow Joint, Disarticulation at.—Seldom done. Best to cut a large anterior flap (Lister).

FINGERS, AMPUTATION OF.—Usually done by disarticulation. To remove the second or third phalanx, cut a single palmar or double (palmar and dorsal) flaps. As the heads of the bones form the knuckles, the articulations are just in front of the knuckles. In case of injury here, as elsewhere, "cut according to your cloth."

Metacarpo-phalangeal Disarticulation.—So-called "oval," really "pyriform," incision. Commence half an inch posterior to head of metacarpophalangeal joint, carry incision right round palmar surface of base of finger and back again. Divide lateral ligaments, twist the bone out of its place and remove it. Extensor tendon should be cut by first incision. Removal of head of metacarpal makes hand more sightly, but much weaker.

FOOT, AMPUTATIONS THROUGH.—*Chopart's*—Between scaphoid and cuboid on the one hand, and astragalus and calcis on the other. Long plantar flap, reaching to roots of toes; very short dorsal flap. Incisions commence, on inner side, just behind prominence of scaphoid; on outer side, one inch behind base of fifth metatarsal bone. Beware of opening ankle-joint. Disarticulate before cutting plantar flap. Plantar flap to be longer on inner than outer side. Arteries: dorsalis pedis, plantar and digital.

De Lignerolles'.—Removes all the bones of the tarsus,except the astragalus. Heel and dorsal flaps.*

Hancock's—Leaves the astragalus and posterior end of os calcis, on the principle of Pirogoff's.

Lisfranc's (commonly called Hey's).†—Between tarsus and metatarsus. Long plantar flap, reaching to roots of toes, longer on inner than outer side. Dorsal incision nearly transverse, with only slight convexity forwards. Ends of incisions, on inner side, one inch before tubercle of scaphoid,on outer side just behind base of fifth metatarsal. In disarticulating, remember dove-tailing of second metatarsal bone into cuneiform bones, and the obliquity of cuboido-metatarsal joint. Cut plantar flap from behind forwards after disarticulation, but cut its borders deeply down to bone when commencing operation. Arteries: dorsalis pedis, plantar and digital.

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* Highly praised by Nelaton.

† *Hey's operation differs from Lisfranc's, in* that the former saws through the second *metatarsal bone.*

HAND, AMPUTATION THROUGH.—Not a single bone should be unnecessarily removed. The flaps have usually to be taken from where soft tissues are most available.

HIP-JOINT, AMPUTATION AT.—Three ways: 1, long anterior flap; 2, double flap, anterior and posterior; 3, lateral flaps. Use Lister's tourniquet for aorta, or Davy's lever per rectum; let patient's buttocks project beyond edge of table, tie body and sound limb to table, have three assistants and stand on left side of limb. Assistants: 1, takes charge of flap and pays greatest attention to instantly stopping all hæmorrhage; 2, manipulates limb: he has mainly to prevent locking of operating-knife, especially by keeping great trochanter out of the way; 2, control tourniquet.

Long Anterior Flap Operation.—Left hip: transfix from a point midway between Ant. Sup. spine of ilium and great trochanter to another point just in front of tuberosity of ischium. Knife should pass behind femoral vessels and lay open hip-joint. Right hip: transfix in the same way, but in the opposite direction. Other operative procedures same for both right and left limb. Length of flap, 8 or 10 inches. Next, draw knife across capsule of joint, opening it freely. Divide ligamentum teres and external rotators. Cut vertically downwards through remaining soft parts.

Manipulations by Assistant having charge of limb.—1, whilst anterior flap is being formed, flex slightly, adduct, and rotate inwards. Then extend and rotate outwards, till, the ligaments being divided, head of femur leaves its socket with a sucking noise. Then, again slightly flex, adduct, and extend forcibly. Absence of posterior flap favors drainage. Arteries: femoral, profunda, obturator, sciatic and minor branches.

Double-flap Amputation.—Manipulations and proceedings resemble preceding; but there are two flaps, anterior, five inches, posterior, four inches long. In cutting posterior flap, have limb rotated inwards to clear great trochanter.

Lateral Flaps.—External is composed of skin. Internal, of skin and muscle, is cut from within outwards. Angles, where flaps join, are: in front, just outside femoral vessels, behind, close to tuberosity of ischium.

When done for injury, amputation at hip-joint is almost always fatal; when for disease, three recover out of five.

KNEE-JOINT, DISARTICULATION AT.—Chief methods: 1, anterior skin-flap; 2, antero-posterior double flaps, either the anterior or the posterior being the longer; 3, long posterior flap (usually including flesh); 4, lateral skin-flaps; 5, anterior and posterior skin-flaps, with circular incision through muscles. The patella is generally left; then the tendon of the quadriceps extensor may be divided. Incisions in lateral flap method begin one inch below tubercle of tibia. Flaps to be somewhat square. Cartilage to be left, unless diseased. *Mortality.*—For disease, one in three.

LEG, AMPUTATION OF.—Any one of the ordinary methods can be used; but double-skin flaps and circular through muscles are very good. Care should be taken not to lock the knife between the two bones, and not to turn its edge upwards in cleaning between the bones. The sharp anterior edge of the tibia should be bevelled off with the saw. Sawing through the fibula should always be completed before the division of the tibia. *Mortality.*—For disease, one in twelve; for injury, 60 per cent.*

PENIS, AMPUTATION OF.—Clover's clamp or tape to check hemorrhage. Corpus spongiosum to be cut half-an-inch longer than C. cavernosa. Value of galvanic cautery ecraseur. Urethra to be split into three and sewn to skin. Skin to be divided higher up than the "corpora," *i.e.*, the very reverse of the principle adopted in amputating a limb.

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*These statistics of amputations are average; and, of course, differ from those of some exceptionally successful surgeons. Moreover, surgical operations have been steadily increasing in safety for years, thanks to Lister and others.

SHOULDER-JOINT, AMPUTATION OF.—Three chief methods, viz., 1, lateral flaps; 2, anterior and posterior flaps; 3, oval incision. But in cases of extensive injury to upper arm, almost any operation may be expected to give a satisfactory stump.

Lateral Flaps.—Transfix in cases of injury. Cut from without inwards when for disease. Knife, narrow-bladed. Three assistants: 1, holds the limb; 2, raises the flap; 3, follows the knife as it cuts behind the humerus, and grasps the inner flap with the axillary artery. Subclavian may be compressed. Position of operator: for right limb, stand before; for left limb stand behind. Right side; enter knife midway between acromion and coracoid process. Left side, enter well behind spine of scapula, at posterior border of axilla. Outer flap should contain most of deltoid. Secondly, open capsule, divide muscles attached to great tuberosity (arm rotated inwards) and subscapularis (arm rotated outwards). Thirdly, having dislocated head of humerus, pass knife behind it and cut down for a distance of three inches, keeping close to inner side of bone (so as not to divide artery too soon). Then complete inner flap by turning edge of knife inwards and cutting through. Arteries: axillary, circumflex, subscapular, &c.

Oval Amputation.—When uncertain whether to resect joint or amputate, perpendicular incision may be made as for resection (*quod vide*), and the joint examined. Then, if desirable, the limb can after all be removed by cutting obliquely right round the limb from and to the lower end of the longitudinal incision. This is Spence's plan.

Mortality.—For disease, one in two; for accident, one in three.

THIGH, AMPUTATION OF.—*Methods.*—1, Gritti's; 2, Carden's; 3, Spence's; 4, lateral flaps (Vermale's); 5, circular; 6, double flap by transfixion; 7, mixed; 8, Teale's.

Gritti's.—Done "just above condyles with an anterior flap, in which the patella is preserved, its surface being sawn and applied to the cut surface of the femur." Incision extends from upper end of fibula to inner side of joint, reaching downwards below patella.

Carden's.—Through the condyles. Single anterior flap. Circular cut through deeper parts. Slight retraction of them before sawing bone. Advantages: the medullary canal not being opened, there is less risk of pyæmia. The skin of knee is accustomed to bear weight of body in kneeling; &c. Arteries: popliteal and some of its branches.

Spence's.—Long anterior; no posterior flap; circular cut through muscles; retract two inches and saw bone.

Lateral Flaps.—Not to be recommended. This operation and the other modes of amputating thigh all done in the ordinary way. Arteries: femoral profunda, external circumflex, anastomotica magna if flap reaches low down, muscular branches.

Mortality of Amputation of Thigh.—After injury, three in five (much more in military practice); after disease, one in three. But for chronic knee-joint disease it is particularly safe.

THUMB, AMPUTATION OF.—1, At *Carpo-metacarpal Joint.*—Incision along dorsum of metacarpal bone, commencing at palmar side of trapeziometacarpal joint and ending at web of thumb. Flap from ball of thumb, by transfixion. Right thumb: transfix first. Left thumb: transfix after making dorsal incision. Operator should stand beside the hand or forearm, not in front of it; otherwise his own left hand will get in his way. Beware of locking knife under sesamoid bones; and keep close to metacarpal bone, to avoid wounding radial artery. Arteries: dorsales and arteria magna pollicis.

2. *Thumb at Metacarpo-phalangeal Joint.*—Oval amputation.

TOE, GREAT.—*At Tarso-metatarsal Joint.*—Two methods, flap and oval.

1. *Flap.*—Cut a flap from whole length of inner side of metacarpal bone. Better not transfix for this. Then transfix between first and second metacarpals, and cut downwards right through web of toes. If possible, save base of metacarpal bone ; otherwise divide tendon of peroneus longus and disarticulate. Beware of sesamoid bones, and of dividing communicating branch between dorsalis pedis and external plantar artery at base of interosseous space. Artery divided always : first digital.

2. *Oval Amputation.*—Commence incision half-an-inch posterior to where the bone is to be divided or disarticulated.

TOES.—Amputated same way as fingers.—C. B. KEETLEY.

ANÆMIA.—*Natural History.*—A special morbid state in which there is either a relative diminution of the mass of blood with the general composition of the blood differing from the normal standard ; or in which the mass of blood is diminished, and the liquor sanguinis is watery, poor in albumen, and containing an excess of salts. These conditions, co-existing with relative deficiency of the red blood-corpuscles, and a diminution of the urine-pigment, constitute anæmia.

The term anæmia literally means absolute deficiency of blood—a condition of existence obviously not possible. A diminution in the quantity of blood, with an alteration in its composition, almost never occurs alone, but is generally a morbid state resulting from many exhausting morbid processes peculiar to such wasting constitutional diseases. In many of these diseases the blood-mass is evidently diminished. There are indications of this diminution in the small pulse, in the pale bloodless appearance of the countenance and surface of the body generally, especially seen in the lips and gums, and in the small blue collapsed veins, particularly obvious by contrast on the pallid skin. In such cases one would never think of drawing blood to know whether or not its constitution was changed ; but in cases where the opportunities for examination have occurred, the blood-corpuscles have almost always been found relatively diminished ; and accordingly the College of Physicians of London define anæmia simply as " deficiency of red corpuscles in the blood." The causes which lead to this diminution are obscure ; and at one time the spleen and glands have been held as concerned in bringing about the disease by some abnormal exercise of their functions.

The result of this morbid condition of the blood chiefly betrays itself—(1.) upon the vascular system generally ; and (2.) upon the metamorphoses of tissues.

The blood-vessels contract in proportion to the diminution of the blood-mass. The arteries contract generally ; and the pulse, whenever it can be felt, is found to have become small and tense. The capillaries also contract, the skin and mucous membranes becoming pallid and comparatively bloodless. The heart's action in extreme cases becomes irregular, and the whole circulation generally is disturbed.

As regards the metamorphoses of tissues, the muscles and the nervous system appear to suffer first ; debility and prostration. both bodily and mental, occur ; and in severe cases sensation may be lost, syncope is frequently apt to occur, and even death may result.

Those exhausting diseases which are attended especially with deranged nutrition and sanguification, such as Bright's disease, carcinomatous diseases, and suppuration, lead also to the development of that form of anæmia in which the liquor sanguinis is in excess, in which the blood is poor in albumen, containing an excess of salts, and in which the blood-cells ultimately become deficient. A tendency to general dropsy or to diarrhœa ensues, nutrition becomes still more disordered, and new formations are apt to become developed.

Diagnostic characters of anæmia have also been recognized in various murmurs which may be heard in some parts of the vascular system of anæmic patients. There are three kinds of anæmic murmurs which may be distinguished, namely—(1.) Cardiac murmurs; (2.) arterial murmurs; and (3.) venous murmurs.

Treatment.—The energies of the physician must be directed to discover and counteract the cause of the anæmia. Nutritious substances must be supplied for diet, in the shape of easily digested meat and broths. The purely tonic treatment, in the combination of air, exercise, and diet, must be carried out as far as practicable. A change of air is absolutely necessary, and generally also of diet. Iron is one of the best medicinal remedies. The astringent preparations are pre-eminently tonic; and are especially useful when the anæmia is associated with or dependent upon inordinate discharges. Solution of the perchloride of iron (tinct. ferri perchloridi), in doses of ten to twenty minims, in water, infusion of quassia, or calumba; and if the anæmia is associated with diarrhœa, menorrhagia, or leucorrhæa, the solution of the pernitrate of iron is a remedy generally attended with great benefit. For delicate females and children the saccharated carbonate of iron is a most valuable preparation, in the form of mistura ferri composita, to the extent of one or two ounces for a dose; or in the form of the pilula ferri carbonatis, in doses of from five to twenty grains in the twenty-four hours. The citrate of iron and ammonia is another remedy which possesses scarcely any astringency, and may often be given in cases of anæmia when the stomach will not bear more astringent preparations. Five to ten grains of this salt may be taken during the twenty-four hours. It is best taken during effervescence, prescribed in solution of citric acid and not in bicarbonate of potash solution. If it is put into the latter, carbonic acid will be given off, and probably burst the bottle. Tincture of orange-peel is the best flavoring agent; but as the salt will not dissolve in the tincture alone, it is necessary to dissolve the salt in water first, and then add the tincture, otherwise the division into doses is impracticable.—WILLIAM AITKEN.

ANÆMIA OF SKIN.—Anæmia of the skin may be general, as in chlorosis, after loss of blood, exhausting discharges, etc.; or local, under the influence of cold, undue action of local vasomotor nerves, pressure, etc.

It is of importance only so far as it modifies the appearances of eruptions, and produces apparent retrogression in such as are characterized by hyperæmia. Thus the exanthems of scarlatina and measles may fade if exposed to cold, or an old psoriasis be lost sight of after severe hæmorrhage, only to reappear as the former vascularity of the skin returns.

Treatment.—The application of cold water, spirit lotion, or lotio carbonis detergens, to relieve the burning and itching in active hyperæmia, is all that is necessary.—MALCOLM MORRIS.

ANÆSTHESIA, Artificial.—The term usually applied to the production of insensibility to pain for surgical or medical reasons. This state is induced for five purposes: 1, To relieve the pain of operations or examinations; 2, To facilitate such proceedings as the reduction of dislocations and herniæ; 3, Where spasm interferes with diagnosis; 4, Where hysteria or malingering is suspected; 5, as a curative agent, *e. g.*, in puerperal convulsions.

Anæsthetics are either general or local. General anæsthetics in ordinary use: 1, chloroform; 2, ether; 3, a mixture of chloroform, ether, and alcohol; 4, bichloride of methylene; 5, nitrous oxide gas.

Their physiological action consists in paralyzing temporarily almost all the nerve-centres, except those necessary to maintain life.

Advantages and disadvantages peculiar to each.—Nitrous oxide is the least dangerous, but it is inconvenient for long operations. It is, *par excellence*, *the* anæsthetic for short operations. Bichloride of methylene has a quick action and causes little vomiting. Recovery is rapid; but it is more dangerous than ether, and perhaps as dangerous as chloroform. It is used in ophthalmic surgery and for ovariotomy. Chloroform has a quick and powerful action, is comparatively agreeable to take, and seems safe enough for children; but for adults is more dangerous than ether. It frequently causes vomiting. Ether is safe and powerful, and not much slower than chloroform when properly given. On the other hand, the patients sometimes require strong assistants to manage them in the stage of excitement; and in all bronchitics bronchial irritation is produced. As air should not be mixed with ether, it is not adapted for operations about the mouth. The mixture of alcohol, chloroform and ether is much liked at Guy's Hospital. (Chloroform has been said to be quite safe for parturient women, but several deaths have been recorded.)

Modes of Administration.—Always see that all buttons and braces about neck and chest are loose. In bloody operations about the mouth the patient should sometimes be turned on his side. Prone position permissible if required. Carefully watch respirations and pulse, especially the former.

1. *Chloroform.*—Recumbent position. Clover's inhaler. Other inhalers. Piece of lint. Towel. Allow free access of air. Commence gently. Pour ʒ ss. upon the towel to begin with.

2. *Ether.*—Best administered in a towel folded conically with a sponge at the bottom, or a cone of mackintosh lined with felt. Two ounces are not too much to begin with, and the drug should be administered boldly, especially in the stage of excitement. If the drug be pushed vigorously then, complete anæsthesia usually follows immediately; if indecision or timidity be displayed, the patient's struggles last a long time. No air should be allowed to get under the apparatus, which should be held firmly down over mouth and nose. Patient may pull it off, unless assistants are arranged before commencing so that they may be ready to restrain the patient the moment restraint is necessary. ℥ j. of ether is to be put into the cone from time to time. The patient's face is red and congested, and his breathing apt to be stertorous. Much saliva is secreted.

2A.—It is an excellent plan to administer successively nitrous oxide and ether, a mixture of the two, and lastly ether alone. Mr. Clover has contrived an apparatus which answers this purpose admirably. No stimulant should be given before administering ether. Pure anhydrous, washed ether always to be used. Robbins' ether for local anæsthesia is dangerous.

3. *The Mixture,* of alcohol 1 part, chloroform 2 parts, and ether 3 parts, is to be given like chloroform; but the air should not be allowed to mix quite so freely with the vapor (?).

4. *Bichloride of Methylene.*— ʒ j. is placed in Rendle's apparatus. This is a cone of leather lined with flannel, has small perforations at the apex, and is held close over the mouth and nose, as in giving ether. If a second drachm is afterwards used to prolong the anæsthesia, the effects resemble those of chloroform.

5. *Nitrous Oxide Gas.*—Is given pefectly pure, from a bag, which is replenished from an iron bottle, which contains the gas compressed to a liquid state. The appearances produced are somewhat alarming; for the blood is temporarily "unoxygenated," like venous blood. But this is not really dangerous.

Causes of Danger from Anæsthetics.—1, sudden stoppage of respiration, either from paralysis of nerve-centre, or from mechanical obstruction, *e. g.*, falling back of the tongue, or passage of blood into larynx; 2, sudden paralysis of the heart. But it would appear that heart-disease does not contra-indicate anæsthetics; and ether is a powerful cardiac stimulant; 3, shock.

Precautions.—1, do not push the anæsthetic too much at first. Be careful about the quantities used; 2, allow plenty of air with chloroform; 3, recumbent position; especially with chloroform, though not required with gas; 4, loosen all tight coverings on chest and neck; 5, have ether of the right quality; 6, it should be possible to let a free supply of fresh air into the room if necessary; 7, administrator should confine his attention to the administration only; 8, he should carefully watch the pulse and respiration—the former most closely with chloroform, and the latter with ether.

Treatment of Dangerous Symptoms.—Pull the tongue out of the mouth. Clear the throat out if there be any suspicion that blood or vomited food is obstructing the larynx. This failing, tracheotomy may be found justifiable. Artificial respiration. Galvanism; one pole on the throat near the phrenic nerve; the other in pit of stomach. Hot affusion to head. Perpendicular position, with head downwards. As much fresh air as possible.

Local Anæsthetics.—Extreme cold produced—1, ice and salt; or, 2, ether spray. Use twice as much powdered ice as salt, in a gauze bag. Useful for small operations on the skin or about the nails; excision of small epitheliomata, etc.—C. B. KEETLEY.

ANÆSTHESIA. Sensory Paralysis.—Sensation may be more or less impaired—hypæsthesia, or completely lost—anæsthesia. Generally it involves the whole thickness of the tissues of the part affected, but may be confined either to the skin or to the muscles. Anæsthesia may be gradually established, sensation becoming more and more impaired, or it may occur suddenly. When this condition exists, the patient is wholly insensible as regards tactile sensations, and may be pinched, pricked, cut or injured in any other way without being aware of it. In hypæsthesia the sense of touch is more or less indistinct, and the patient feels as if a thick layer of some soft and yielding material, such as cotton-wool or flannel, intervened between the skin and anything brought into contact with it. This is especially noticed in connection with the hands and feet, when the patient grasps anything or stands. In this condition also, as well as during the development of anæsthesia, various unusual sensations or paræsthesiæ are often experienced, such as numbness, formication, tingling, or pins and needles. In some cases, even of complete anæsthesia to objective impressions, neuralgic pains of a subjective character are complained of in the affected part. It is a curious fact that in exceptional cases, although tactile sensation is lost, the power is retained of distinguishing differences in temperature, or of feeling painful impressions. Occasionally, in connection with marked hypæsthesia, the impression of anything brought into contact with the affected surface seems to be delayed in its passage to the nerve-centre, so that it may be some seconds before the patient is conscious of it. There is often in this condition great difficulty in distinguishing different sensations from each other. With regard to muscular sensibility, when this is lost there is almost always loss of muscular contractility, but in exceptional instances this is unimpaired. In cases of cutaneous anæsthesia reflex irritability may be destroyed, normal, or increased, according to the cause of the loss of sensibility. The distribution of sensory paralysis presents the same variations as in the case of motor paralysis. This it may be: 1. General. 2. Unilateral—Hemianæsthesia. 3. Bilateral, but affecting only the legs and the lower part of the bod·. 4. Disseminated. 5. Local. The etiology of the two kinds of paralysis is also very similar, and it will only be necessary to allude briefly to the more frequent varieties of sensory paralysis, but it may be remarked that all forms are not uncommonly associated with functional diseases, especially hysteria.

1. Hemianæsthesia, when present, is usually the result of some cerebral lesion, but in a large number of cases of hemiplegia from this cause sensation is intact, or it may be impaired at first, but is speedily restored.

Moreover, in cerebral hemianæsthesia sensation is not as a rule completely lost, or it may be retained in certain parts, or the anæsthesia may be irregularly distributed. The lesion generally implicates the optic thalamus or the white substance in its immediate vicinity, but may be situated in the posterior portion of the cerebral convolutions. In rare instances hemianæsthesia results from disease of one lateral half of the spinal cord, the loss of sensation being on the side opposite the lesion.

2. Bilateral anæsthesia, involving the legs and lower part of the body, is almost invariably associated with paraplegia, and is due to disease or injury of the spinal cord. Sensation is, however, more or less retained in many cases where the power of motion is completely lost.

3. Local anæsthesia is generally due to disease of some special nerve, or of its nucleus of origin, its seat varying accordingly. It might possibly be associated with localized disease affecting certain of the posterior convolutions of the brain. When a particular nerve is paralyzed, if it is a compound one, sensation and motion will be equally impaired. One of the best illustrations of paralysis of a purely sensory nerve is that of the superior maxillary, or of its continuation the infraorbital; sensation is then lost in the parts to which this nerve is distributed, and when the patient attempts to drink out of a glass or cup, a very curious feeling is experienced, as if the vessel was broken opposite the middle of the upper lip. Nutrition and secretion are frequently seriously interfered with when sensory nerves are paralyzed.

Treatment.—The general remarks made as to the treatment of paralysis of motion apply equally to that of sensation. Local warmth, friction, and electricity are often useful. The latter must not be resorted to for some time in cases of anæsthesia or hypæsthesia from cerebral causes, and even then only very cautiously; it does not lead to much improvement in most of these cases. Faradization with a brush acts best. Electricity is often very beneficial in various forms of sensory paralysis met with in hysteria, either faradization or Franklinic electricity being employed, the latter by directing sparks on to the affected parts; changing this part and then drawing sparks from it; or applying a small charge from a Leyden vial. If sensibility is lost locally from destruction of a nerve, no benefit can be anticipated from electricity. When motor and sensory paralysis are combined, electrical treatment directed to the former may improve the latter at the same time. Particular care is mecessary in cases of sensory paralysis as regards cleanliness and avoidence of pressure.—FREDERICK T. ROBERTS.

ANASARCA.—*See Dropsy.*

ANEURISM.—A considerable dilatation of an artery, or any hollow tumor communicating with the interior of an artery.

Classification.—According to the relation of its sac to the wall of the artery, into—1, true; 2, false; and 3, dissecting aneurism. According to its shape into fusiform and sacculated. And, according to its apparent cause into spontaneous and traumatic. Cirsoid aneurism and varicose aneurism not usually included in this classification.

A true aneurism used to always mean one whose sac consisted of all three arterial coats. The term, rarely now used at all, often means merely that the sac is formed chiefly by the walls of the artery. False, in the same way, may mean either that the sac is wholly, or that it is chiefly, formed of tissues outside the artery. Dissecting aneurisms are formed when the blood burrows between the coats of an artery.

Causes.—Dilated arteries are almost always found to be atheromatous (Vide Atheroma of Arteries)—1, occupation: soldiers, sailors, employments where severe and prolonged efforts are required irregularly. Soldiers are chiefly liable to thoracic, sailors to subclavian and axillary aneurisms (probably from climbing, &c.) ; 2, abuse of alcohol ; 3, syphilis ; the liability of soldiers is partly attributed to the latter two causes, and partly to the strain on the thoracic organs, caused by the old-fashioned stock and knapsack ; 4, strains ; 5, age : very rare in childhood ; commonest between thirty and forty ; 6, traumatic aneurisms are caused by direct wounds.

Pathology.—An idiopathic aneurism begins by the dilatation of a diseased part of the wall of some artery. The whole wall may be so softened as to dilate ; but usually the inner coat is ulcerated, and then, from the first, the aneurismal sac consists only of the outer and part of the middle arterial coat. But always, before the tumor reaches the size of an average orange, all trace of distinction between the arterial walls and the surrounding tissues is lost in its sac. In the meantime, wherever the inner coat of the artery is absent, the blood tends to deposit layer after layer of fibrin ; the outer layers, after a time, have become organized and pale, while the inner are still soft and dark-colored. Fusiform aneurisms have the inner coat of the artery most sound, and only a few shreds of fibrin adhere to their walls. The wall of an aneurism itself tends to thicken and strengthen. Adjacent parts are pressed upon, nerves are irritated or paralyzed, ducts obstructed, bones absorbed.

Symptoms.—Patient generally applies for advice either because of the swelling, or of the pain caused by the pressure of the tumor ; but the earliest symptoms are generally those of slight muscular weakness of the limb. Tumor, in the course of some artery, soft at first, harder as it progresses. Pulsation, expansive. Bruit, loud and rasping, or soft, or altogether absent. Pulse below aneurism weak. Often œdema, neuralgia, spasm or paralysis from pressure on veins or nerves. Compress artery above, tumor less tense or smaller ; compress artery below, tumor may become larger or more tense. The tumor can often be partially emptied by pressure.

Diagnosis.—May be confounded with—tumors, or abscesses in the course of large arteries ; malignant tumors of bone ; or mere enlargements and relaxation of the artery. It is always to be borne in mind that the pulsation of an aneurism is heaving, while that of a vascular tumor is usually sudden and more abrupt ; also, that aneurisms do not always pulsate,* and that when an aneurism is emptied by pressure, it gradually returns to its full size. Diagnosis from Tumors and Abscesses pressing on the Artery. —1, such swellings mostly have no bruit ; 2, their pulsation is an equable rise and fall, and not expansive ; 3, an abscess probably shows signs of suppuration (but an aneurism may suppurate too) ; 4, the tumor can often be dragged off the artery which communicates to it its pulsation.

Diagnosis from Pulsatile Tumors of Bone.—1, Bruit in pulsatile tumor rarely so well marked, and often absent ; 2, pulsation more sudden and less expansive ; 3, signs are often to be found in the state of the neighboring bone ; thus, a plate of bone may be felt in the tumor. Pulsatile tumors may dilate the bone ; aneurisms cut a clean hole through bone ; 4, these tumors being almost always cancerous, may be accompanied by other signs of cancer.

Diagnosis from Aneurismal Dilatation.—By the absence of all marked symptoms of a genuine aneurism.†

Prognosis.—Spontaneous cure does sometimes occur, but very rarely. Without treatment a fatal event from bursting of the sac is to be expected. With treatment the patient's chance depends mainly on the situation of the aneurism, partly on its cause, the fitness of the case for operation, and on whether the aneurism be single or multiple.

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* For Diagnoses, &c., of aneurisms which do not pulsate, see Holmes, in *Brit. Med. Journ.*, Jan., 1880, and Morrant Baker, in *St. Barth's Hosp. Rep.*, 1879. Auscultate and observe the effect of pressure on the main artery.

† From Holmes's System, vol. iii., p. 455.

Course.—Enlargement in size ; formation of layer after layer of coagulum ; absorption, first of adjacent parts, and next of the aneurismal sac itself. Then one of the following terminations :—

Terminations.—1 (most common), rupture of sac and death ; 2, escape of piece of clot, embolism beyond aneurism, and spontaneous cure ; 3, suppuration of sac ; 4, flow of blood through aneurism checked by its own growth and pressure on artery above ; 5, coagulation may go on to so great an extent as to fill sac with fibrinous laminæ, and stop pulsation and further enlargement ; 6, the condition may remain stationary. All these events, except the first and sixth, may cause spontaneous cure. But the third may cause fatal hæmorrhage. Aneurisms burst through serous membranes with a large opening, causing instant death, but through mucous membrane and skin with a small opening so that death is preceded by several hæmorrhages.

Treatment.—Classified into internal or medical, and external or surgical. Every method aims at producing a clot which shall stop the growth of the aneurism, excepting the method of Antyllus. Surgical Treatments are 1, ligature (Anel's, Hunter's, and Brasdor's operations); 2, pressure (instrumental and digital); 3, flexion; 4, use of Esmarch's bandage (Reid); 5 acupressure and temporary ligature; 6, manipulation; 7, galvano-puncture; 8, coagulating injections; 9, wire in the sac

Ligature Method of Antyllus.—Operation.—Command artery above aneurism. Open sac and turn out clots. Find the arterial orifices opening into it, and tie the artery above and below aneurism, controlling hæmorrhage in the meantime by pressure with the fingers. When suitable: 1, in gluteal aneurisms; 2, axillary aneurisms; 3, traumatic aneurisms at bend of elbow; 4, when an aneurism has been opened accidentally; 5, when the sac has burst.

Hunterian Operation.—Artery tied at point of selection above aneurism. Operation.—Instruments: scalpel, forceps, retractors, artery forceps, ligatures, aneurism-needle, &c. Observe land-marks, incise or separate structures to expose sheath of vessel, make a very small opening in the sheath, gently separate artery from sheath at point selected. Pass aneurism-needle from the side where vein lies. The great advantages of Hunter's operation are that artery is most likely to be healthy, and certain to be accessible, at the part named.

Anel tied the artery immediately above the aneurism.

Brasdor's Operation.—Artery tied on the distal side of aneurism. Chiefly applicable to carotid in aneurisms at root of neck.

Pressure.—Either (1) direct, *i. e.*, upon the aneurism itself—very unusual; (2) upon the artery. Effected either by the fingers or by mechanical contrivances, *e. g.*, Carte's tourniquet or P. H. Watson's weight compressor. The treatment by Esmarch's bandage should be classed as a treatment by pressure. Under anæsthesia almost any aneurisms, except the thoracic, may be treated by compression; and certain thoracic aneurisms might perhaps with advantage, be treated by distal compression of the carotid, &c., on the principle of Brasdor's operation. Statistics of results much better than those of ligature. But prolonged, unsuccessful compression sometimes appears to make worse the prognosis of a subsequent operation for ligature.

Prepare the patient by rest in bed and limited diet (both as to fluids and solids). Chloral if necessary. Bandage limb, shave seat of pressure and dust it with hair powder. If pressure be instrumental, and there be room, apply two instruments to the artery and use them alternately. Keep bedclothes well off the tourniquets. Patients may sometimes be instructed to manage his own treatment. Anodynes if necessary. Use the minimum pressure absolutely necessary to check the flow of blood. Keep it up continuously even during sleep if the patient can be got to bear it. In compressing the abdominal aorta or the iliacs it is best to produce anæsthesia and keep it up for hours. Aneurisms may thus be cured by one spell of compression.

Digital compression requires relays of assistants. A weight should be suspended so as to press down on the assistant's fingers, and supply the compressive force. Duration of pressure treatment, very variable, often a month, in some cases cure has resulted in a few hours.

Many valuable papers on and cases of treatment of aneurism by compression are to be found in the *Dublin Medical Journal.*

3. *Flexion.*—Especially applicable to aneurisms situated in the flexures of joints, *e. g.*, popliteal, and on the superficial aspect of the artery. Bend the limb, not too acutely at first, and fix it thus with straps, buckles or bandages. Rest in bed and restricted diet as accessories. Slight simultaneous compression of artery above sometimes advisable. (See Ernest Hart, *Med.-Chi. Trans.*, vol. xlii., p. 405.)

4. Esmarch's bandage should be applied under anæsthesia, and may be kept on for two hours or more. But one application for one hour has been found quite sufficient. (Dr. W. Reid, R. N.)

NOTES ON SPECIAL ANEURISMS.—*Aorta, Aneurism of.—Thoracic.*—See medical works. Usually treated by rest and restricted diet (Tufnell's treatment). Galvano-puncture and distal ligature (*i. e.*, of the carotid) have both been employed beneficially.

2. *Abdominal Aneurism.*—May be either of aorta or of one of its branches. Diagnose from "hysterical pulsation," from pulsating cancer and from abscess. In hysterical pulsation there are no true aneurismal bruit and no tendency to progress, but there are concomitant signs of nervous disorder. The other sources of error may be avoided by applying general principles, and watching a doubtful case for a short time. Treatment must generally be medical; but success has attended compression of abdominal aorta under anæsthesia for several hours. (Murray, *Med.-Chi. Trans.*, vol. xlvii.) Directions for tying the iliac arteries will be found under Arteries.

Axillary Aneurism.—Generally treated by ligature of subclavian (3d part). Compression of subclavian. Operation of Antyllus recommended by Syme.

Carotid Aneurism.—Commonest seat—bifurcation of common carotid. When seated at root of neck tie distally (Wardrop's and Brasdor's operation).

Femoral Aneurism.—Comparatively common and admirably suited for treatment by compression. If ligature is resorted to, external iliac must be tied for aneurism of common femoral.

Gluteal Aneurism.—Usually traumatic, and singularly liable to be mistaken for abscess. Suitable cases for such treatment as galvano-puncture. "Many cases, I have no doubt, might be cured by compression of the aorta or common iliac artery under chloroform."—Holmes. Compression per rectum might be also suggested. See also Holmes, *Lancet*, July 11, 1874.

Orbital Aneurism.—Usually common aneurism, but very exceptionally "cirsoid." *Symptoms.*—Besides pulsation there are displacement of the eye-ball and loss of sight. *Treatment.*—Spontaneous cure possible. Compress carotid digitally. Other treatment dangerous, but may be unavoidable. Ligature would have to be applied to the common carotid. Refer to Rivington, *Med.-Chi. Trans.*, vol. lviii.

Subclavian Aneurism.—Ligature of the innominata and of the first part of the subclavian artery have been always fatal, excepting in one case. Therefore, subclavian aneurism is best adapted for the diet and rest treatment, or for galvano-puncture, or for manipulation. Amputation at the shoulder-joint is in some cases justifiable. Willett has suggested a combination of amputation at the shoulder-joint with ligature of the carotid.—C. B. KEETLEY.

ANEURISM, Arterio-venous.—Under this title are included two forms of aneurismal dilatation of an artery, communicating with a vein, known respectively as varicose aneurism and aneurismal varix.[*]

Varicose aneurism consists of a circumscribed consecutive aneurism, which communicates with the artery on one side ond the vein on the other. The vein is always tortuous and dilated, sometimes to an enormous extent. In aneurismal varix there is no aneurismal sac. Adhesion has occurred between the artery and the vein at the point at which they communicate; and the blood is projected directly from the artery into the vein at each pulsation. Here also the veins connected with the diseased part are greatly dilated, and the embarrassment of the circulation thus produced is the chief symptom of the affection.

Both varicose aneurism and aneurismal varix may originate spontaneously, though they are more commonly the result of an injury in which the artery and vein have both been wounded. By far the most frequent course is the unskilful performance of venesection at the bend of the elbow. Hence the affection is rarely seen now, when the operation is not often performed, and only by surgeons. Any other punctured wound, however, may give rise to the disease, as the wound of a small shot, or the fragment of a comminuted fracture; and so, it is said, may a simple contusion.[†]

But occasionally, in lieu of effecting the closure of the venous channel, the pressure of the aneurismal pouch of the artery gives rise to absorptive ulceration of the coats of the vein, and the sac opens either by rupture or by ulceration into that vein. This happens especially within the thoracic and the abdominal cavities, when aortic aneurisms press upon the great venous trunks of the chest and abdomen.[‡]

Less frequently, arterio-venous aneurisms arise in the same way on the limbs, and on other parts of the trunk. Sometimes these occur long after the infliction of a wound which had affected the artery, but which had been perhaps almost forgotten.

It is usually a main artery and its collateral vein which are thus affected; and it may be readily understood that, from their close contiguity and often superficial position, these would be more likely to become the subjects of this diseased connection; but the elaborate investigation of M. Follin and Charnal, [¶] and the cases of Puydebat [**] and Pancoast [††] have shown that deeply-seated veins as well as superficial veins may be thus affected.

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[*] William Hunter was the first to describe arterio-venous aneurism accurately; and he also pointed out the difference between an aneurismal varix and a varicose aneurism, though he did not use those terms. See South's Chelius, vol. ii. p. 272.

[†] It is perhaps worth notice that the communication may occur between two vessels which are not naturally in contact, but which have been brought together by the force that inflicted the wound. Thus in the Museum of St. Bartholomew's Hospital, there is an interesting preparation (ser. xiii. No. 121.) in which a small sac is formed communicating with the internal jugular vein and the external carotid artery. The cause was a punctured wound from the point of a pickaxe, and a small fragment of the iron has lodged and is impacted partly without and partly within the cavity of the vein.

[‡] The earliest and most complete monograph on these forms of aneurism is due to Thurnan, Med. Chir. Trans. vol. xxiii. See also Rokitansky, Cteber eringe der Wichligsten Krankheiten der Arterien, Wien, 1852, p. 46 et seq.; Porter on Arterial Disease; in Todd's Cyclopædia of Anatomy; Nelaton's Clinical Lectures, by Atlee; Mayn, *Dublin Med. Journal*, 1854.

[¶] Bulletin de la Soc. de chir. vols. iii. 5.

[**] Bulletin de la Soc. Anat. 1834.

[††] Fergusson's Handbook of Surgery, 1852.

These two forms of arterio-venous aneurism have some symptoms in common, due to the communication between the artery and vein. The most characteristic is a vibratory thrill, which results from the impulsion of the arterial blood into the patent aperture of the vein, there to mingle with the venous current. The greater tension of the arterial than the venous wall, and the greater force of the arterial flow of blood, causes a continuous injection of arterial blood into the venous tumor, but the pulsation of the artery produces a synchronous impulse in the flow of the blood through the tumor. Hence the peculiar vibratory or pulsatory character of the thrill which is otherwise continuous. The ear detects a harsh, buzzing sound, which has been variously compared to that of a saw, a file, a bee, the hissing of burning metal plunged into cold water, and similar noises. This sound too, is continuous, although momentarily increased during pulsation. It grows fainter on being propagated along the artery, and at some distance from the aneurism in which it arises it seems intermittent, the louder pulsatory sound only being then heard. This sound may be so loud as to be audible by a person standing near the patient; but that is exceptional. It may, however, always be distinctly heard with the stethoscope, or by the naked ear; and its continuous character sharply distinguishes an arterio-venous from a pure arterial aneurism. Considerable dilatation of the veins, a third symptom, is consequent upon the obstruction of the venous circulation by the entrance of arterial blood flowing in an opposite direction, and upon the general increase thus made to the quantity of blood which the vein must carry towards the heart. The extent of this dilatation varies according to the size and importance of the vessels affected. It is most marked in the lower limbs, where gravity aids in increasing the obstruction and consequent tendency to varicosity. Here the veins have been described like knotted ropes beneath the skin, by Porter, Perry, Langier, and others. In Mr. Moore's case, where the temporal vessels were affected, the veins were enormously dilated, and pulsated so strongly as entirely to simulate arteries during the operation performed.*

This pulsation of the veins is a fourth important symptom which deserves to be borne in mind; because the surgeon may be, and has been, induced by it to place a ligature round one of the veins, thinking it to be an artery. William Hunter noticed that the arteries below the point of communication beat more feebly than in a healthy body; and naturally, since a part of their ordinary supply of blood is directed into the vein. But this symptom is not always observed. The temperature of the part, and the growth of hair on the skin, are sometimes augmented below the communication. In old-standing cases, a remarkable condition of dilatation is observed in the arteries, above the varix. They become enlarged, tortuous and thinned in structure. Indeed, the veins around the arterio-venous aneurism assume more or less of the arterial character, and the arteries approach somewhat the type of veins. This has been observed by all who have described these cases, and is well summarized by Rokitansky in his monograph on the pathology of the arteries.

The varicose aneurism differs from the aneurismal-varix, as we have seen, in that it possesses an aneurismal pouch which is intermediate between the opening of artery and vein. It is, of course, important in practice to recognize this difference, and mark its peculiar symptoms. This circumscribed aneurismal tumor will be found of various size and density, according to the site and duration. It rarely attains, however, any considerable size. It is affected in the same way as pure arterial aneurisms when the artery is compressed above or below it, and the ear detects the blowing sound of an aneurism in addition to that rasping bruit described as the result of the venous communication.

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*Med. Chir. Trans., Vol. xli. p. 1.

In both forms of arterio-venous aneurism it may be said that we find a soft, fluctuating, knotted and imperfectly circumscribed subcutaneous tumor. It can be emptied by pressure upon the tumor itself, or the artery leading to it. It has distinct pulsations; but these are limited to a very small part of the swelling at the level of the point of communication between the vessels, gradually becoming extinct in the ratio of distance from that point. In this it is distinguished from arterial varix or cirsoid aneurism, which offers pulsation of equal intensity over the whole extent of the tumor; it may be further distinguished from that affection by the blue or purple color of the tumor, and by the tortuous dilatation of the veins leading to it. Further, to distinguish it from arterial varix, to which it presents so many points of external resemblance, it may be added that while in both anscultation detects a loud rasping, continuous bruit, this sound is heard over the whole surface of the arterial varix, but only at the point of communication in the arterio-venous aneurism, or, if it radiates therefrom, it can then only be traced along the course of the artery, and becomes gradually extinct.

Treatment of Aneurismal Varix.—The treatment of aneurismal varix and varicose aneurism must be mentioned separately; that of aneurismal varix presents great difficulties. In many cases, indeed, the disease manifests but little tendency to advance; and where this stationary condition exists, surgical interference may well be omitted. In Mr. Moore's case, thirty-six years had elapsed before any operation was necessary; and Hunter, Cleghorn, Porter, and indeed all other authorities on this subject, have seen this occur. It is especially the case in the upper extremity. In the lower limb, however, the disease may extend so greatly as to destroy the use of the limb, or to threaten the destruction of the patient's life by hæmorrhage. In the case referred to, as related by Mr. Perry, the Hunterian ligature was twice performed, but without effecting the cure of the disease. In a case mentioned by Mr. Bransby Cooper it was considered necessary to amputate the leg. Should the surgeon now be called upon to treat, by operative means, an artery so affected in either of the extremities, he would probably attempt to obtain the closure of the arterial aperture by indirect pressure on the artery above the communication. The use of direct pressure has rarely been of any good effect. There are, however, two proceedings which are more promising: the injection of coagulating fluids at the site of the disease, applied carefully, with the minute precautions necessary for the success of that plan; or ligature of the artery above and below its aperture of communication. Before employing either method, it would probably be desirable to resort to digital or instrumental compression, or, if the position allowed, to forcible flexion. But the constant passage of the arterial blood through the apertures, resulting from the arterio-venous communication, and the absence of any defined sac, impede the formation of the fibrinous deposit to which these methods owe their success; and cases of aneurismal varix of this form are not very amenable to treatment by indirect compression. An interesting case is recorded in the proceedings of the Anatomical Society of Paris for 1858, in which indirect compression having been carefully tried, but without success, a ligature was applied by Mr. Robert above and below the aperture in the artery. A few cases have been recorded of aneurismal varix within the skull.* In one of these, recently, compression was applied over the carotid, but ineffectually; in this case the internal carotid artery communicated with the cavernous sinus, and death occurred as the result of profuse hæmorrhage from the nose. In such cases, of course, only the Hunterian ligature is possible; but where the artery is more accessible, it is obviously more desirable to apply a ligature above and below the diseased communication.

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* Bulletin de la Societe Anatomique, vol. xxix., 1859, p 298, and vol. xxx., p. 178.

The Treatment of Varicose Aneurism is somewhat different in kind; for here a sac intervenes between the artery and the vein, but it is similar in principle. Here also direct and indirect compression have been largely tried. In general such trials have not been very successful. M. Nélaton, however, has succeeded four times in converting a varicose aneurism at the bend of the elbow into a simple arterial aneurism by direct pressure. Cure was then in all cases effected either by ligature or compression of the brachial artery.[*] Digital compression might be employed in the simpler cases, not without hope of cure.

Should it be necessary to apply the ligature, it is requisite to reject the method of Hunter in favor of the ancient proceeding. The most simple plan is to lay open the sac, trace it into the artery, and having exposed the aperture in the artery, for which purpose it is commonly necessary to divide the sac transversely on a director, then to apply a ligature above and below the arterial opening. This method is more simple than that which has been employed by Roux and Fergusson, who have endeavored to isolate the artery, and tie it above and below without opening the sac at all.[†] This is the more difficult, that the artery below its point of communication is small, and surrounded by veins dilated and closely packed. On the other hand, it is free from the objection attaching to the plan first described, arising out of the danger of putting two ligatures close to the sac, and at a point where it is surrounded by dilated veins. In any case the operation is peculiarly liable to one or two secondary accidents, hæmorrhage and gangrene; hæmorrhage from the part of the artery above the sac where it is dilated, thinned, and gives rise to numerous collateral branches; and gangrene of the limb below, which perhaps already, before the operation, was cold, benumbed, and œdematous. The injection of a weak solution of perchloride of iron has been employed by Serres and Jobert,[‡] Velpeau[‖] and Vallette,[§] twice with perfect success, once producing suppuration of the sac, followed by cure, and once, by M. Velpeau, ineffectually. These facts are in favor of this method of treatment, and as the safeguards against the accident of suppuration are more carefully studied, this plan may recommend itself still more strongly to the surgeon.

Galvano-puncture has been employed by Bosse and Capeletti. In Bosse's case two steel needles, connected with thirty-two pairs of galvanic plates, were introduced into the aneurismal tumor, and retained there for eighteen minutes. The cure was completed within ten days.

In Capeletti's case the needle was introduced twice, suppuration followed and ultimately a cure. M. Debout has also recorded a successful case [¶]

There will be cases in which an expectant treatment will be most advisable, and others in which amputation might be the only available measure. —T. HOLMES.

ANEURISM, Cirsoid.—By cirsoid aneurism is understood a form of disease which consists in a simultaneous elongation and dilatation of an artery. The structure of its wall exhibits in the beginning no alteration, although the coats become thinned during the progress of the enlargement. It will be observed that this lesion is not strictly included in the terms of the definition which was given of aneurism, and recent authors have agreed that this disease is improperly denominated aneurism. But it seems practically most convenient to describe it here.

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[*] Jour de Med. et Chir. Prat., 1862, p. 155.

[†] This operation was recently performed successfully by Prof. Spence in a case of arterio-venous aneurism of the femoral artery. (*Edin. Med. Journ.*, July 1869.)

[‡] Balletin de l' Acade. d Med., 1854.

[‖] 'Traitement de l' an anevrisme arterio veineux', Bulletin de' Academie de Medicine, 1854.

[§] Acad. de Med. Paris, May 23, 1859.

[¶] See Wernher, III. 821.; Ciniselli, sulla Elettro puntura nella cura deg'li Aneurismi: Cremona, 1856. Debout, Bulletin de Therapeutique, 1849, P. 123.

It is especially the middle coat of the artery which is affected when the process of thinning commences.

This structure becomes pale, soft, and thin, so that the arteries look like thin veins. The dilatation is commonly equal throughout the circumference of the artery; but in the more severe cases the artery is greatly dilated, and presents unequal saccular pouches, which are, in fact, so many true aneurisms, projecting usually towards the surface of the skin. As the artery elongates, it becomes tortuous and serpentine, sometimes even spiral. The disease is rarely circumscribed, but attacks commonly several trunks and their branches. M. Broca, however, has described a case of perfectly circumscribed cirsoid aneurism of the scalp, treated successfully by the injection of perchloride of iron*. It may occur in the arteries of the extremity, and Cruveilhier has reported a remarkable case of cirsoid aneurism of the external iliac artery †. But it is more especially frequent in the arteries of the scalp, and in this situation more instances have been regarded than in all the other parts of the body taken together. Originating usually in one of the arteries of the scalp, it extends itself to the branches of the other side of the head and may implicate the connected vessels to a variable extent. On the one hand, it may pass into the capillaries, widely dilating them, and affecting even the terminal veins in its march; or on the other, but in a smaller degree, it may affect by retrogression the larger branches from which the arteries of the scalp arise, passing even into the carotids. It is thus that it changes somewhat its anatomical characters. The venous capillaries and trunks become affected by the extension of the disease, and the arterial network becoming highly and morbidly developed, this form is known by the name of aneurism by anastomosis. The pathological condition and the principles of treatment are substantially the same; but when the disease is seated in the larger arterial trunks, it is commonly known as cirsoid aneurism; when it extends into the network of capillaries, it is known as aneurism by anastomosis, or racemose aneurism. It attacks most frequently the superficial temporal, the posterior auricular, and the occipital arteries. Commonly the surrounding tissues suffer but little injury; but sometimes the subcutaneous cellular tissue may be atrophied, and the skin dangerously thinned; at other times the soft parts may be thickened and indurated; sometimes the bones are grooved, or even perforated.

M. Gosselin‡ has endeavored to subdivide cirsoid aneurisms into three classes: Arterial varix, when large arteries are affected (as in Cruveilhier's case); cirsoid arterial tumor, when the smaller arteries are affected, forming a circumscribed lobulated pulsatile tumor; and aneurism by anastomosis, when the capillaries and skin are involved. The distinction is a real one in many cases, and useful to recollect, having an important bearing on practice; but the three forms are too much mixed together to enable us to accept it as a classification of the disease. The second class are those in which coagulating injections, according to M. Gosselin, are likely to succeed; and I would add that in the third class galvano-caustic or extirpation are the methods usually indicated.

The causes which give rise to cirsoid aneurism are not apparent. Occasionally its origin has been referred to a blow, or to an injury of a congenital erectile tumor; more often no cause can be assigned, and it is not evident why the scalp should be the chosen seat of this disease. It may be noticed here that the majority of cases occur in persons whose age varies from fifteen to thirty. The diagnosis of the disease can hardly be a source of difficulty, for the serpentine and pulsating character of the tumor afford a distinguishing sign. The manner of diagnosing this affection from varicose aneurism or aneurismal-varix has been mentioned in the last section. But where it is associated with dilatation of the veins, some difficulty may arise in distinguishing it from the so-called erectile tumor, or teleangeiectasis, from which it is, however, still distinguished by its pulsations. Such cases have been recorded by Pelletan[*], by Dupuytren[†], and others.

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* Bulletin de la Societe de Chirurgie de Paris, 1859.

† See also Coctean, "Sur les Varices arterielles des membres," Arch. gen. de Med., 1865, p. 666.

‡ Arch. gen. de Med., 1867.

The treatment of this disease commonly offers great difficulties and many risks. The frequency with which direct failure has followed various procedures, the yet greater frequency of relapse, and the occasionally fatal termination of operations which have been undertaken, are reasons for caution in dealing with this disease. Unless there is reason to fear that by its extension or by its severity it may prove fatal to life, it is commonly the more prudent course to abstain from operative interference. Cirsoid anastomosing aneurism is not always a source of imminent danger, and it may exist for many years without any other evil effect than that of inconvenience; and, indeed, in some of the least unfortunate cases it has so continued after various operations. Even where extensive and severe, it cannot always be treated with advantage.

The simplest method of treatment is by compression; but this is also the most ineffectual. I am not acquainted with any case in which it has proved successful, although trials havé been recorded by Dupuytren, Robert,[‡] and Brodie[§]. If palliation be desired, little more can be done than to provide a metal covering to protect the affected part, where the locality admits of such a provision. The ligature of the branches directly leading to the affected part has been often tried, but this also has rarely succeeded. In a case in which Breschet tied the temporal artery in a girl eighteen years of age, for a severe form of the disease, death from pyæmia took place on the fourteenth day,[‖] the ligature having been carried through and round the vessel. Maclachlan tied the temporal artery, also without success, and followed it by ligature of the common carotid.[**] In a patient of Dupuytren's, both the temporal and occipital arteries had been tied unsuccessfully.[††] Gibson in a similar case tied the main branches of the temporal and occipital artery ineffectually.[‡‡] The records of the results of this proceeding are not in its favor.

The ligature of the external carotid has been performed for a cirsoid aneurism of the scalp by Maisonneuve.[§§]

Prof. Bruns,[‖‖] who has given great attention to this subject, points out that the ligature of the external carotids is the proceeding best calculated to cut off the supply of blood to aneurisms of the scalp. He urges that the external carotids of both sides should be ligatured in such cases, and certainly where it is necessary, from repeated local hæmorrhages or threatened rupture, to employ serious surgical interference, the ligature of one, and still more of two external carotids, would best effect the diminution in the supply of blood to the arteries in the scalp; for then only the supra-orbital and frontal branches of the internal carotid would remain capable of supplying blood in this direction; and unless the disease were seated in the forehead, their influence need hardly be feared. Posteriorly the blood would reach the scalp only through the anastomosis of the occipital arteries with the ascending cervical branches of the subclavian and the muscular twigs of the vertebral artery; whilst in front some further assistance would be given by the connection of the inferior thyroid branch of the sub-clavian with the superior thyroid .branch of the carotid. This suggestion might not be unworthy of the consideration of surgeons in future cases.

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[*] Pelletan, Clinique Chirurgicale, Vol. II., p. 59. Paris, 1810.

[†] Dupuytren, Lecons orales, Vol. V., p. 43. Paris, 1839.

[‡] *Gaz. des Hopitaux*, 1851, p. 130,

[§] *Lancet*, 1828–9, vol. II., p. 559.

[‖] Breschet, *Memoires Chirurgicaux sur les differentes especes d' Aneurismes*, p. 54. Paris, 1834.

[**] *Lancet*, 1827–8, vol. I., p. 773.

[††] *Lecon's ovales*, loc. cit.

[‡‡] *Institutes and Practice of Surgery*, vol. I. Philadelphia, 1735.

[§§] *Bulletin de la Societe de Medicine de Paris*, vol. I., p. 400.

[‖‖] *Handbuch d' Pract. Chir.* I., p. 161. Lubingen, 1854.

Judging from anatomical data, the ligature of the common carotid artery, while it is pregnant with greater dangers, offers fewer advantages than the application of the same procedure to the external carotids. It has, however, been practiced in at least fifteen cases, but its successes have been few. The only superiority which it possesses over the ligature of the external carotid is by shutting off the supply through the branches of the ophthalmic artery; but the large and numerous anastomoses of the carotid of the opposite side continue to supply blood, and even where a temporary improvement has followed the operation, speedy relapse has occurred, probably from this cause. Again, the disturbance of the cerebral circulation by ligature of the common carotid has of course its own peculiar dangers. So that, out of eighteen cases in which the operation was performed, death occurred under the knife in three instances, and four others terminated fatally; in five an early relapse followed the first improvement; in the tenth case no final report has been given; and in only two is it stated that there was lasting improvement. Instances in which the common carotid has been tied for this disease are recorded by Robert, Dupuytren, Kuhl, Bush, Wardrop, Maclachlan, Maisonneuve, Walther, Massey, Warren; Hersche, Kerr, Zeiss, Arend, Travers, junior, Mott, Wood, and Critchett.

A proceeding which has proved so fatal in the hands of surgeons so eminent must be regarded with great distrust. It is certain that in very many cases the dangers of this operation must be greater than those of the disease itself; and when those perils are surmounted, its success must still remain a contingency, which in the past has only three times been nominally realized in eighteen cases. Attempts have been made to cure cirsoid aneurisms by a method conceived after the old proceeding of Antyllus for true aneurisms. It has been proposed to lay open the tumor by a stroke of the scalpel, to stuff the arterial wound with lint, arrest hæmorrhage by firm compression, and trust to the inflammatory exudation thus excited for the obliteration of the arterial canal. It is obvious that this method could only be applied to those cases of circumscribed cirsoid aneurism in which the artery forms a limited tumor by its convolutions, and to cases of limited aneurism by anastomosis. Grafe first employed this proceeding for a cirsoid aneurismal tumor of the forehead in a boy aged ten.* He divided it across with a strong scalpel, stuffed the wound quickly with agaric and sponge, and firmly strapped and bandaged the whole on the following day, as the pressure was slightly relaxed, the wound granulated, and when the parts healed there was no pulsation in any part of the solidified tumor. Bell,† Arnott, and Lawrence,‡ have succeeded also in curing aneurism by anastomosis, by incising the soft parts, and promoting suppuration in the tumors, maintaining meantime compression. It would not be reasonable to expect that the obliteration of a single large artery in a state of cirsoid dilatation could commonly be satisfactorily effected in this way; not only the fear of secondary hæmorrhage presents itself, but we know that arteries are but little prone to adhesive inflammation, and that arterial blood is quick to find outlets and make channels for itself. In a case of truly cirsoid aneurism this proceeding will almost certainly fail.

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* *Grafe and Walther's Journal*, vol. XVIII. p. 20.

† Bell, *Principles of Surgery*.

‡ Lawrence, *Med. Chir. Trans.*, vol. IX.

A more efficient means of destroying circumscribed cirsoid aneurism is to be found in extirpation en masse by the knife or by ligature. The latter method was employed by Sir B. Brodie with only temporary success in treating a cirsoid and anastomosing arterial tumor of the head of the size of a walnut, which had the characteristic feeling as of a convolution of meandering vessels with strong pulsations. The tumor was transfixed crosswise, and strangulated by four threads in as many parts. The cure was reported at the time to be complete. But Mr. Prescott Hewett mentioned in a lecture at the Royal College of Surgeons the fact that the disease recurred in this case, and that the patient died some years afterwards, death being attributed to "nervous debility."

Grafe, Gibson, Weitzer, Buset, Warren, and Gueniot have also employed this method. Mr. Hart employed it successfully; freezing the tumur and cutting wide of it, so that very little blood was lost. The difficulties of this method, however, have proved very great, and its danger is considerable. The hæmorrhage in some of these cases was excessive. But the issue of all the recorded cases in which it has been undertaken has been, successful, and excision by the knife has as yet proved a most rapid, safe, and successful means of treatment. It is obvious that great skill and caution are required to carry it into effect, and in very extensive developments of the disease it will be inapplicable. It might commonly be prudent to preface the extirpation of the tumor by the ligature of the main trunks which feed it; when practising the incisions around the tumor, the knife should travel slowly, and the arteries are to be tied as they are divided. It was by the combination of well timed caution and necessary boldness that some of these formidable operations have been brought to a successful issue.

Cirsoid aneurisms have also been treated by galvano-puncture, galvano-caustic, and coagulating injection.—T. HOLMES

ANEURISMAL VARIX.—*See Aneurism, Arterio-Venous.*

ANEURISM BY ANASTOMOSIS.—*See Tumors, Vascular.*

ANEURISM, Thoracic.—The aorta is by far the most common seat of aneurism within the chest, but the innominate, the commencement of the left carotid or subclavian, or the pulmonary artery may be involved.

Etiology.—Aneurism almost always results primarily from some morbid change in the walls of an artery, especially from chronic endarteritis and the atheromatous changes connected therewith, but also sometimes from mere fatty degeneration or simple atrophy. Its determining cause is generally more or less violent exertion, which throws a sudden or frequent strain upon the weak portion of the vessel, and this may even lead to rupture of part of its coats. It may be developed in this manner either suddenly, or more or less gradually.

Aneurism is much more common among males, especially those whose occupation entails violent efforts, and about the middle period of life. It is comparatively extremely frequent in the army, and this has been attributed to the combined effects of great exertion, tight clothing, which compresses the neck and chest, and obstructs the circulation, and heavy accoutrements. The diseases which predispose to changes in the vessels, such as syphilis, gout, and rheumatism, may be considered as predisposing causes of aneurism, especially syphilis. It has been stated to be occasionally hereditary, but this is probably only true as regards the degeneration of the vessels.

Anatomical Characters.—The following varieties of aortic aneurism are met with : 1. There may be a general dilatation involving the whole circumference, and either cylindrical, fusiform, or, very rarely, globular in shape. 2. Sacculated aneurism is the most important, in which there is a lateral bulging or sacculation of a portion of the circumference, the coats being either entire,—simple or true aneurism ; or more or less of the inner and middle coats being destroyed,—compound or false aneurism. Sometimes all the coats give way, and the aneurism is bounded only by surrounding structures, diffuse aneurism. 3. In extremely exceptional cases a dissecting aneurism is observed, the blood finding its way between the coats of the vessel. The ascending portion of the arch is most frequently affected, especially on its convex side, where the aorta is most exposed to strain ; an aneurism may exist, however, on any part of this vessel, even between the pillars of the diaphragm. Great varieties are presented as to size, exact shape, contents, and other characters.

Symptoms.—The symptoms of aortic aneurism are far from uniform, being chiefly due to pressure on surrounding structures, and therefore influenced by its situation, size, form, rapidity of formation, and direction of growth ; while they are also liable to alter during its progress. The symptoms are by no means in proportion to the external physical evidences of aneurism ; indeed the reverse is often true, because the more an aneurism tends in an inward direction, the more severe are the symptoms likely to be, and they may be extremely aggravated, when it is impossible to detect any sign by physical examination. In some cases there are no symptoms or physical signs from first to last. Abnormal local sensations are usually present, such as pain varying in character and intensity, heat, fulness and weight, or throbbing, while tenderness is common. If the aneurism passes backward the pain may be deep and gnawing or grinding, owing to destruction of the vertebræ. Among the most frequent pressure symptoms are those indicating interference with the main air-tube, which in many cases first attract attention. The constitution often suffers markedly, even when there are no particular local symptoms or signs, and I have sometimes observed a very striking appearance of illness, combined with anæmia or a sallow cachectic look, and an anxious, distressed, or irritable expression, but without any particular emaciation, which has led me to suspect internal aneurism when there was no evident cause to account for these phenomena. The posture assumed by patients suffering from aortic aneurism depends upon its situation and other circumstances ; as a rule they cannot lie down, but keep the head high, and some have a tendency towards a prone position, so as to take off pressure from the structures behind ; bending the head forward and then throwing it back suddenly, is considered a movement suspicious of aneurism. The digestive organs frequently suffer. Head symptoms are also common, with disturbed sleep. The urine is not altered. Aneurism may give rise to embolism in some distant organ, especially in the brain.

Physical Signs.—The following include the physical signs which are to be looked for as indicative of aneurism, but not uncommonly they are very obscure : 1. Local bulging may be detected, its site depending upon the part of the aorta involved. If the arch is affected in its ascending or transverse portion the prominence will be in front, opposite or to the right or left of the upper part of the sternum, the exact situation differing much in different cases. Aneurism of the remainder of the arch or of the descending aorta may give rise to bulging posteriorly generally to the left of the spine, occasionally to the right, and it is sometimes very extensive. In shape the swelling tends to be conical, and it involves the ribs and spaces equally. 2. Pulsation over any swelling or even without any enlargement, is an important sign, this being usually synchronous with the ventricular systole, but sometimes double, or it may be more marked during the diastole. The systolic pulsation is usually expansile, and heaving or throbbing. Sometimes it is distinctly undulatory. In exceptional instances a thrill is felt. It is important to observe that the stethoscope may aid in discovering slight pulsation, when it cannot be detected by the fingers. 3. Dulness corresponding to any bulging may be elicited, through frequently extending beyond this to a variable degree and across the middle line, or being observed when there is no actual prominence; it is of a dull, dead, puttylike character, and is accompanied with increased resistance. 4. Auscultation gives extremely variable results. There may be nothing whatever heard or only indefinite sounds. The important auscultatory sign of aneurism, however, is the presence of a rough murmur, usually systolic, occasionally double, or very exceptionally only diastolic. 5. There may be signs of hypertrophy of the left ventricle, but in most cases in which the heart is affected this organ is merely displaced downwards and to the left. If the aneurism lies behind, the heart may be so pushed forward that the chief impulse is observed at the base. 6. Examination of the larynx and lungs might reveal functional disorder of, or organic mischief in the former, displacement of and interference with the entrance of air into the latter, or bronchial catarrh on one or both sides. 7. The radial pulse often affords important signs, especially to the sphygmograph. The chief characters are that the pulse is delayed on one side, or that it differs in fulness and force on the two sides. The sphymograph reveals even a slight difference in the two pulses, but this is very marked in some cases. The dicrotism is often influenced also, and when the descending aorta is involved this may be much increased, especially on the right side. An aneurism is capable of influencing the pulse, not only by its own direct effect upon the circulation, but also by obstructing the main arteries in consequence of pressure, closure of their orifices by a clot, or torsion.

Modes of Termination.—Death is the ordinary termination of aortic aneurism, and it may be immediately due to: 1. Gradual asthenia. 2 Effects of pressure. 3. Rupture and consequent hæmorrhage, which may take place into the pericardium, heart, neighboring great vessels, pleura, mediastinum, trachea, or either bronchus, lungs, œsophagus, spinal canal, or externally. 4 Independent affections, either acute or chronic.

Diagnosis.—It would be easy to write to almost any extent on the difficulties which might and do arise in the diagnosis of thoracic aneurism, but it must here suffice to offer a few general observations on the subject. It is not only necessary to determine the presence of an aneurism, but also its seat, variety, size, and other characters as accurately as possible. In some cases the signs are so evident, that there is but little difficulty in making out all that is required; but the following classes of difficulties are principally met with, viz.: 1. There may only be symptoms indicating more or less pressure within the thorax; or sometimes merely obscure or ill-defined sensations, with constitutional disturbance, but no external signs. 2. An aneurism may give rise to the physical signs of a tumor, but without any pulsation or murmur. 3. Other pulsating prominences are occasionally observed besides aneurisms, the pulsation being usually transmitted from the heart or aorta.

The chief morbid conditions which aortic aneurism is liable to simulate or *vice versa*, are a solid mediastinal tumor or abscess, the latter occasionally presenting pulsation; pulsating empyema; phthisical consolidation at the left apex, with subclavian or pulmonary murmur; swelling over the sternum from chronic periostitis or abscess; a tumor or suppuration in other parts of the chest-walls; pericardial effusion; innominate aneurism; cardiac disease. Among very rare conditions may be mentioned coarctation of the aorta, varicose aneurism, and aneurism of the pulmonary artery.

The points to be taken into account in making a diagnosis are as follows: 1. The age and sex of the patient; previous history, especially with regard to occupation and former diseases; family history; and that of the origin and progress of the complaint. 2. The presence or absence and exact characters of pressure signs. 3. The other symptoms observed, particularly noting whether there is general dropsy or albuminuria. 4. The exact situation of any prominence. 5. The precise site, extent, rhythm, and characters of any pulsation, especially noting whether it is heaving and expansile, double, or attended with thrill, and if it is distinct from the cardiac pulsation. 6. The seat and extent of dulness, particularly observing whether it is in the course of the aorta, or crosses the middle line, and if it corresponds most to any pulsation which may be evident. 7. The presence and characters of murmurs, but care must be taken not to mistake these for conducted cardiac murmurs. The characters of the pulse, especially as revealed by the sphygmogragh, and also the effects of pressure upon the great vessels in the neck.

The distinctions between aneurism and a solid tumor will be hereafter considered. The chief difficulties arising in the diagnosis of aneurism from cardiac diseases are, that aneurism may be simulated by enlargement of this organ accompanying valvular disease, especially if the aorta is atheromatous, or that an aneurism with very thin walls and fluid contents, pushing the heart downwards and to the left, may be mistaken for mere cardiac enlargement. The principal circumstances in favor of cardiac disease are there being but one centre of impulse; the physical signs corresponding to the region of the heart, or being most marked here; the absence of pressure-symptoms, and the presence of general dropsy or albuminuria.

As regards the form of an aneurism, the signs in favor of general fusiform dilatation are given by Walshe as more diffuse pulsation, both above and below the clavicle, well-marked thrill, rough, prolonged rasping, whizzing, or whirring murmur, which is systolic, audible along the arch, or louder there than over the aortic orifice, and absence or slight degree of pressure signs .

The part of the vessel affected must be determined by the locality of the physical signs, and the exact pressure phenomena observed; comparison of the radial pulses, especially as revealed by the sphygmograph, may afford some aid.

In distinguishing innominate aneurism from aortic, the following considerations have weight : The physical signs correspond in situation to the innominate artery, the prominence appears early, and it may displace the clavicle ; it is said that dysphagia and dyspnœa from the pressure of an innominate aneurism are rare, but I have known both these symptoms extremely severe ; there are often signs of pressure on the nerves of the right brachial plexus, and on the right bronchus ; the right radial pulse is always modified, and pressure on the carotid and subclavian arteries on the same side diminishes the pulsation.

Treatment.—The first object in the treatment of an aneurism should be to endeavor to bring about its cure by promoting gradual coagulation within the sac, but this can only be aimed at in the sacculated variety of aortic aneurism. Failing this, it is necessary to protect the aneurism, to retard its development as much as possible, and to treat the symptoms and complications which so frequently arise.

1. If it is intended in any case to attempt to cure a thoracic aneurism,

it is absolutely essential to keep the patient at rest in the recumbent posture for a considerable time, and to avoid every source of physical or mental disturbance. Formerly it was the custom to have recourse to starvation and repeated venesection, but at the present day this has been with good reason modified into a careful regulation of diet, a definite quantity of solids and liquids being administered at stated intervals, according to Mr. Tufnell's method. The exact amounts allowed must depend upon each individual case, but everything should be strictly weighed or measured, the object being to support life with as little food and drink as possible, without inducing nervous irritability. Excess of fluid must be particularly avoided, and all stimulants are to be prohibited. In some instances it may be advisable to remove a little blood from time to time, but it is very important to avoid inducing an anæmic condition.

The objects of this attention to rest and diet are to calm the circulation as much as possible, and to render the condition of the blood more favorable for coagulation, and undoubtedly some cases do improve considerably under this treatment alone. Medicinal agents, however, may be employed with benefit at the same time, viz., those which subdue and regulate the heart's action, such as digitalis, aconite, or belladonna, and those which promote coagulation, particularly gallic or tannic acid, tincture of steel, acetate of lead, and iodide of potassium. The use of iodide of potassium has been particularly advocated by Dr. William Roberts, of Manchester, and Dr. George Balfour, of Edinburgh, when given in large doses, even as much as from fifteen to thirty grains thrice daily, and continued for a long period. I have found this drug of decided value in some cases. Subcutaneous injection of ergotin has also been recommended.

2. It must suffice merely to mention certain operative procedures which have been resorted to with the view of curing aortic aneurism. These are: 1. Injection of perchloride of iron into the sac. 2. Manipulation of the sac externally. 3. Galvano-puncture. 4. Introduction of a quantity of fine iron wire through a canula. 5. Ligature of the right carotid and subclavian arteries.

3. It would occupy too much space even to mention the various symptoms and complications which may require attention in the progress of a case of aneurism, and only a few practical points can be alluded to here. It is always well to keep the aneurism covered with cotton-wool; and should it be particularly prominent, some kind of protecting shield might be worn. For relieving pain and procuring sleep, the chief internal remedies are opium, morphia, hyoscyamus, lactucarium, hydrate of chloral, bromide of potassium, and conium in full doses. Subcutaneous injection of morphia is also most valuable. External applications are frequently useful, such as belladonna or opium plaster; belladonna or aconite liniment; cold poultices of linseed meal and vinegar, conium, digitalis, or oak-bark (Walshe); ice, ether-spray, or chloroform cautiously applied; counter-irritation by flying blisters or iodine, which sometimes gives marked relief. Galvano-puncture may relieve pain considerably, as in a case thus treated by Dr. Bastian, which I had an opportunity of observing. If there are severe laryngeal symptoms, evidently due to pressure on the recurrent nerve, it is decidedly justifiable to perform tracheotomy, and let the patient wear a tube in the trachea permanently. It has been suggested that in some cases the sterno-clavicular ligaments might be divided with advantage, in order to allow displacement of the clavicle forwards, and thus take off pressure from behind.—FREDERICK T. ROBERTS.

ANEURISM, VARICOSE.—*See Aneurism, Arterio-Venous.*

ANGINA PECTORIS.—*Etiology and Pathology.*—There has always been much difference of opinion and discussion as to the explanation of the symptoms which characterize an attack of angina pectoris, and as to the condition of the heart during the paroxysm. Formerly the complaint was regarded as of neurotic origin, due to some disturbance of the cardiac plexus, leading, according to one view to spasm, according to another view to paralysis of the walls of the heart. That some cases of angina are due to such disturbance is unquestionable, and this is borne out by experiment as well as by clinical and pathological observation. It may thus arise from intrinsic disorder of the excito-motor cardiac nervous system, from direct irritation of the cardiac branches of the vagus, or from reflex excitement, especially due to irritation in connection with the abdominal organs. The pathology of the majority of cases of true angina pectoris is at present, however, differently explained. It is supposed that it arises from general vasomotor spasm, due to increased stimulation of the vasomotor nerve-centre, which leads to spasmodic contraction of the vessels, and this causes acute distension of the left cavities of the heart, which consequently are embarrassed and act with difficulty, being unable to empty themselves perfectly. During a paroxysm there is marked rise in blood-pressure, with increased tension, as was first shown by Dr. Lauder Brunton by the aid of sphygmographic tracings. Should an attack prove fatal, the heart will stop acting in a state of full distension, and at post-mortem examinations it is generally found flaccid rather than rigidly contracted. Dr. Gairdner suggests that the condition is aggravated by cardiac anæmia, due to vasomotor spasm of the smaller arteries in the heart itself. Therefore true angina pectoris is part of a morbid process, and not a disease of the heart *per se* (Fothergill).

In the large majority of cases angina pectoris is associated with some previous disease of the heart or pericardium, and some change in the nutrition of the organ has always been found in fatal cases. The morbid conditions which have been most commonly observed are extensive atheroma or calcification of the coronary arteries, fatty degeneration of the heart, and flabby dilatation. Anginal attacks do, however, no doubt occur in persons in whom the heart is healthy, and these are the cases in which there is comparatively little danger, the organ being capable of recovering from the sudden distension to which it is subjected; the danger increases in proportion to the extent of structural degeneration of the cardiac walls.

With regard to the exciting causes of an anginal attack, it can seldom at first be attributed to any obvious cause except undue bodily exertion The first paroxysm has been said to set in generally while the patient is walking up a hill, against the wind, after a meal, and especially after breakfast. Not uncommonly subsequent attacks come on after the first sleep at night. Sudden or powerful agitation, and various forms of emotion may bring on a paroxysm. Exposure to external cold is not an uncommon cause, owing, as it is supposed, to its producing contraction of the cutaneous capillaries. Anginal seizures may also arise from reflex disturbance in connection with the abdominal organs, as from heavy meals, indigestible food, or dyspepsia. One form may depend upon direct irritation of the cardiac nerves by growths.

Certain distinct predisposing causes have been made out, namely, the male sex, probably because men are more subject to lithiasis; advanced life, true angina being rarely observed under forty-five to fifty years of age, and a high social position. Several eminent men have died from this complaint. It is believed to be connected with the gouty diathesis, and imperfect anginal attacks are frequently observed in gouty persons, also occurring comparatively early in life in individuals whose fathers have died of angina (Fothergill).

Symptoms.—An attack of angina pectoris comes on as a rule with abrupt suddenness, but warnings of its approach are occasionally present, in the way of curious sensations or slight pain about the cardiac region.

The chief symptom is an intense pain in some part of the præcordial region, generally referred to mid-sternum, which may amount to the most excruciating torture. In character it is described as shooting, plunging, tearing, aching, gnawing, sickening, or burning, but it is often indescribable. At the same time a feeling of oppression or constriction is experienced across the chest, as if it were being forcibly compressed and could not be expanded, attended with a sense of suffocation and inability to breathe, though this act is not really interfered with, and there is not the least indication of cyanosis. If a deep breath can be taken and held, this may relieve the pain. Usually no tenderness is felt, but pressure rather gives relief, though occasionally tenderness over the sternum and adjoining spaces is complained of. Frequently painful sensations shoot from the cardiac region in various directions, especially down the left arm, or, in exceptional instances, the right, even to the fingers, in which there may be sensations of tingling or numbness; upwards along the left side of the neck, directly backwards, or round the side. This is due to the connection of the cardiac with the cervical and first dorsal nerves.

These symptoms are accompanied with signs of grave general disturbance. The face becomes pale, sunken, and covered with cold sweat; while the expression is indicative of the intense anxiety, alarm, and dread of impending death which the patient feels. In most cases the pulse tends to become feeble, and even fluttering or irregular if the attack is prolonged, though at first there is increased tension. The general surface is often pale, cold, and dry; and the patient may feel general chilliness, with chattering of the teeth. Much will depend on the condition of the heart with which the angina is associated, which also necessarily influences the physical signs. Occasionally vomiting and eructations accompany the attack. The patient is quite conscious at first, but in prolonged or fatal cases may fall into a state of syncope, and spasmodic movements or even general convulsions may be observed.

Usually an entire attack is made up of several brief paroxysms with intermissions, but there may be only one; the morbid sensations generally cease suddenly, this being attended with a sense of extreme relief, though a feeling of exhaustion is afterwards experienced, which may last for some time. Very rarely does the first attack prove fatal, but it may thus terminate, either suddenly or gradually. Probably some cases of sudden death are due to angina. A marked character of the complaint is its great tendency to recur under the influence of very slight exciting causes.

A form of angina pectoris is described, which is not attended with pain —angina sine dolore. Here also an affection may be alluded to, named pseudo-angina pectoris, which is probably of a neuralgic character, and is met with mainly among young persons, being characterized by sudden pain and unpleasant sensations about the heart, palpitation, disturbance of breathing, faintness and giddiness, pallor of the face, and feeble pulse. The condition of the patient may appear to be really serious, but very rarely does a fatal termination happen. This complaint is chiefly observed in connection with anæmia; various nervous disorders, especially hysteria; or blood diseases, such as gout. Females are most commonly affected, and it is not infrequent in connection with the menopause. It may also arise from undue exercise after a full meal.

Prognosis.—True angina pectoris is a very dangerous condition, but the false variety is not, therefore it becomes important to distinguish between them. The presence and nature of any organic cardiac lesion will necessarily influence the prognosis materially, and this can only be determined by physical examination. Age has also an important influence on the prognosis, being more serious the older the patient is.

Treatment.—1. In order to prevent attacks any one who is subject to angina should avoid every possible exciting cause, and it is desirable that he should carry some remedy in his pocket, especially nitrite of amyl or opium, so that it may be made use of immediately the least indication appears of the approach of a paroxysm. 2. During an attack any obvious source of reflex disturbance, such as indigestible food, must be at once removed. The internal remedies usually given are sedatives, antispasmodics, and stimulants, especially opium in full doses, hydrate of chloral, the various ethers, chloroform, spirits of ammonia, musk, camphor, and hot brandy and water. Digitalis and belladonna are very useful in some instances, when the cardiac action is much disturbed. Inhalations of chloroform or ether, or, still better, of nitrite of amyl, should be resorted to with due care in severe cases. Nitrite of amyl has been found especially valuable, giving marked relief, and speedily cutting short paroxysms of angina. Patients are in the habit of carrying this remedy about with them, so that it may be used at the first threatening of an attack. Recently the internal administration of nitroglycerin has been recommended in minute doses. Local applications, such as dry heat with friction, sinapisms, or friction with chloroform or belladonna liniment may at the same time be employed. The use of the constant current has also been recommended. Dr. Gairdner advocates warm mustard pediluvia, with heat applied to the arms and thorax. In a gouty person the joints of the feet should be irritated. 3. During the intervals the treatment indicated is that which applies to cardiac affections in general, in the way of regulating the diet and digestive organs; attending to the general and constitutional condition, as well as to the heart and the state of the blood; and to all hygienic matters. Gout must be especially attended to. Tepid or cold baths followed by friction and change of air and scene, are often beneficial. A belladonna plaster should be worn constantly over the cardiac region.

For pseudo-angina similar remedies are indicated during a paroxysm, but they need not be so powerful. At other times the treatment must be directed to the cause of the complaint, and the condition of the patient.—FREDERICK T. ROBERTS.

ANGIOMA.—*See Tumors.*

ANGIOMATA.—*See Tumors.*

ANIDROSIS.—*Definition.*—A condition characterized by a deficiency of perspiration, and occurring as a result either of a constitutional disease or of an altered state of the skin, as in ichthyosis.

ANKLE, Dislocation of.—*See Dislocations.*

ANKLE-JOINT, Disease of.—Swelling causes prominence of and fluctuation beside extensor tendons. Diagnosis from disease of tarsus. In the latter case there is free movement at the ankle under anæsthetics. Prognosis is the more favorable because general exercise can be combined with local rest.

ANKLE-JOINT, Excision of.—*See Excision of Joints.*

ANKYLOSIS.—3 kinds: 1, extra-articular fibrous; 2, intra-articular or ordinary fibrous or false ankylosis; and 3, bony or true ankylosis. In the first case there are not, in the second there are, fibrous bands within the joint. First case results from inflammatory thickening of surrounding parts, contracted ligaments and tendons, &c. Often there is a combination of all three. *Diagnosis.*—In osseous ankylosis there is no motion whatever; in intra-articular fibrous there is some motion, which is checked more abruptly than in extra-articular. Anæsthetics may be required. Sayre tries to move the joint vigorously for two minutes under chloroform. If, within twenty-four hours, any swelling result, the ankylosis is, of course, not bony. *Causes.*—Joint-disease, &c. Osseous ankylosis usually caused by traumatic disease. *Treatment.*—1. Preventive. proper passive motion applied in time. If ankylosis is inevitable, select the best position: 2, Curative.

1. *Fibrous Ankylosis.*—Passive motion, friction, douches, steam baths, screw splints, weights. Anæsthetics: subcutaneous rupture. Take a short hold (near the joint), and try to rupture by flexion. Tenotomy. Division of tight fascia.

2. *Osseous Ankylosis.*—Do not interfere if possible. Fresh disease may be excited, or the operation may be fatal. " Subcutaneous resection." Sawing, drilling, fracturing, cutting out wedge-shaped piece of bone; fracturing shaft of bone just below joint. Little more than a good position usually aimed at.—C. B. KEETLEY.

ANTHRAX—*See Carbuncle.*

ANTHROPOPHOBIA—*See Fear, Morbid.*

ANTISEPTIC TREATMENT, The.—Almost always means Lister's method only. Principles: 1, an open wound does worse than a subcutaneous wound, because atmospheric germs enter it and produce fermentation, resulting in irritation, decomposition, &c., which again lead to inflammation, blood-poisoning, &c.; 2, certain substances, *e. g.*, carbolic acid, destroys these germs. Details: spray, carbolized instruments and hands, carbolized catgut, protective next wound, gauze (usually eight folds), mackintosh just beneath uppermost layer of gauze. Sometimes use a drainage tube; then its end must be well concealed by gauze. Carbolized bandage, elastic bandage in certain cases, safety pins. Explanation of details: spray (strength 1-40;) carbolizing the hands, &c., prevent access of live germs; protective protects from the irritating properties of carbolic acid; gauze absorbs and disinfects discharge; mackintosh prevents discharge from soaking through to the surface, and thus establishing a channel of disinfection. Lotion for washing instruments, &c., (strength 1–40). Dressing should be removed under spray and renewed from time to time, according to amount of discharge, which should not, if possible, be allowed to soak quite through. In absence of spray-producer, and in the case of accident wounds, wash the surfaces with lotion (1–40). Antiseptic " veil " and irrigation, substitute for spray. Boracic and salicylic acid, thymol, and ol. eucalypti have been used instead of carbolic acid. Strength of lotion for use in steam spray-producer, 1–20; steam dilutes it to 1–40.—C. B. KEETLEY.

ANTRUM, Diseases of, may be classified into Cystic Disease of' Suppuration in, and Tumors of Antrum.

ANTRUM, CYSTIC DISEASE OF.—Firstly, there is the form known as Dropsy of the Antrum, not owing to obstruction of antro-nasal orifice, but to cystic disease of the mucous membrane; simple or multiple cysts; bulging into nose, mouth, orbit, and cheek; thinning of bone, even to crackling. Contents: thin, brownish, serous, with cholesterine. *Treatment.*—Catheterize through nose, or tap through anterior wall from mouth, or draw a diseased tooth and tap through its socket. Restore shape of cheek by pressure with a pad. A second variety called " Dentigerous Cysts," connected with malplaced teeth. Small ones common. Large ones cause absorption of neighboring parts. *Treatment.*—Open and remove the contained teeth; stuff cavity with lint till it begins to granulate. If cyst be large, remove part of its wall.

ANTRUM, SUPPURATION OF.—*Causes.*—Carious teeth, blows. *Signs.*—Swelling, pain, puffiness of neighboring soft parts; perhaps escape of pus into nose. *Treatment.*—Remove the offending tooth and perforate through its socket, or extract second molar, or perforate canine fossa with a carpenter's gimlet. Wash out with Condy or carbolic lotion. Keep a free exit for the pus. Restore symmetry by pressure.

ANTRUM TUMORS OF, include, strictly, above mentioned cysts; also fibrous, sarcomatous, osseous, cartilaginous, fatty, erectile, and carcinomatous (epithelial and encephaloid); fourth, fifth, and sixth kinds very rare. Diagnosis practically has only to be made between (1) simple and (2) malignant disease; or between (1) malignant and within the antrum, and (2) malignant and extending beyond the antrum. If an operation is proposed, it should also be determined, if possible, where the tumor began, *e. g.*, behind the antrum or not. In doubtful diagnosis from cysts, determine by perforation. Malignant tumors (1) grow rapidly, (2) early affect submaxillary glands, (3) protrude early into neighboring cavities, forming a fungus. *Point of origin.*—Tumors of malar bone spread over upper jaw; intra-antral tumors expand it on all sides; post-antral tumors push it bodily forwards without distorting it. *Treatment.*—Operative or palliative. Question of operation.—If the soft structures of the cheek are not freely movable over the tumor, and if the glands are affected, do not operate; nor if disease be malignant, advanced, and post-antral in origin. In simple disease remove no more of the maxilla than the side diseased. For the operation, vide excision of Upper Jaw.—C. B. KEETLEY.

ANUS, Artificial—*See Colotomy.*

ANUS, Cancer of, usually spreads from rectum. If primary, commonly epithelioma. May be excised at first See Cripps, on Cancer of Rectum.

ANO, Fistula in.—*Causes.*—It is the sinus left by an ischio-rectal abscess, *quod vide. Varieties and signs.*—Complete and incomplete, former opens both inside and outside anus; blind internal and blind external. Sometimes there are several openings; outer opening usually within one inch of anus; granulation often projecting from it; course of fistula feels hardened and thickened; purulent discharge; tenderness; history of former abscess; constitution often phthisical. *Prognosis.*—Permanent cure difficult if the openings be numerous and phthisis coexist. Ordinary cases easily remedied. *Treatment.*—Introduce first a probe, then a director. Make blind fistula complete. Then slit up, on the director, the bridge of skin and sphincter covering fistula. Precede operation with a purge and an enema. Dress with oiled lint, pad, and T Bandage. Check severe hæmorrhage with styptics and pads. Galvanic cautery. Ligature. Elastic ligature. Coexistence of phthisis does not usually contraindicate operation.

ANUS, Fissure of, usually accompanied by anal ulcer. *Causes.*—female sex; debility, cachexia, dirty habits, eczema. *Signs.*—Burning pains, after defæcation, sometimes lasting for hours; seat pain, of chiefly sacro-iliac articulation; genito-urinary irritation; purulent, bloody and mucous exudation; patient feels and looks worn and despondent; on examining anus carefully (a speculum may be required), one or more small ulcers or fissures seen, generally very tender; sphincter very irritable and spasmodic; ulcer usually near coccyx and just within anus. *Treatment.*—Cleanliness; soap and water; zinc ointment; glycerine of tannin; nitrate of silver; anodyne and astringent suppositories; division of ulcer or fissure and superficial fibres of sphincter to the depth of one-eighth of an inch. Rest in bed for some time after the operation.

ANUS, Imperforate (including congenitally malformed rectum). Six kinds. Case 1. Congenital narrowness of anus. *Treatment.*—Notch and introduce sponge-tents. Case 2. Complete closure of anus; rectum normal. *Treatment.*—Crucial incision; no plug required. Case 3. Closure of rectum by a membranous septum, anus normal. *Treatment.*—Pass an ear speculum up to the septum; pass a tenotomy-knife through speculum, and cutting in the median line, with an inclination towards the sacrum, divide the septum. Case 4. Complete absence of anus. Case 5. Absence of a considerable part of the rectum; often a fibrous cord instead. *Treatment.*—In cases 4 and 5 an attempt may be mde to dissect up to the rectum as follows:—*Operation.*—Keep in mind small size of pelvis and relations of bladder and internal iliac vessels; empty bladder; incise exactly in the position of the anal depression; crucial incision; cut beyond the posterior margin of the depression; cut deeply with first incision; introduce finger with the point upwards and backwards. Generally the cul-de-sac of the bowl can be felt when the child cries, or when the abdomen is pressed upon by the assistant. Puncture upwards and backward; enlarge with probe-pointed bistoury; bring mucous membrane of gut down to external wound if possible; keep open at first with a suppository. If the operation fails, never plunge a sharp instrument into the pelvis; but perform Littre's operation. *Vide Colotomy.* Case 6. Rectum may communicate or open into vagina, bladder, or urethra. *Treatment* case 6.—Plastic operation; operation for artificial anus, or nil. Colotomy sometimes causes a mere communication to close up, and all the fæces to pass per anum.

ANI, Prolapsus, is really a prolapse of rectum, usually of its mucous coat only. *Causes.*—Constitutional weakness. Rectal, genital, and urinary irritation causing straining. Piles. Polypi, urinary calculi, worms, phimosis, constipation. Age of childhood. *Signs.*—Protrusion of a ring of mucous membrane becoming dark an turgid if allowed to remain prolapsed. Strangulation, suppuration, and even mortification may occur. *Treatment*—Reduce prolapse at once. Regulate bowels; mild aperients, Friedrichshall water, "effervescing citrate of magnesia." Recumbent position after, or even during defecation. Astringent injections, alum, tannin, iron. Tonics, iron, strychnia. Always seek for and remove cause. In bad cases ligature parts of the prolapsus, or paint it with strong nitric acid, bathing afterwards in cold water. Incise freely a strangulated prolapsus. Children should have one buttock pulled to one side obliquely during defecation. This causes a tight fold of skin to support anus.—C. B. KEETLEY.

APHTHÆ.—*Derivation.*—From the Greek—*a.* privative, and phasis, speech.

Definition.—A condition produced by an affection of the brain by which the idea of language, or of its expression is impaired.

Two varieties.—Amnesic, and ataxic.

Causes.—Cerebral hæmorrhage, embolism, thrombosis, softening, hysteria, wounds, the bites of poisonous serpents, and syphilis are causes of this condition.

Symptoms.—Inability to express the desires by the appropriate term, an oblivion of names and vocables of all kinds, and a substitution of words in no ways related to them; oblivion of the names of substances in a vernacular language and a facility for calling them by their proper names in a dead or foreign language, or there may be oblivion of foreign and acquired languages and a recollection only of vernacular; oblivion of the sound of words, but not of the letters which compose them; oblivion of the mode of spelling the most familiar words; oblivion of names and ideas but not of numbers.

Prognosis.—Varies with that of the pathological condition to which it is due.

Treatment—Is that of the pathological condition on which the condition is dependent. It is important to make constant efforts to develop the uninjured speech-centre and to exercise the vocal organs by constant attempts to speak. The application of the galvanic or faradic currents to the tongue and other muscles concerned in articulation is a measure of usefulness.—WILLIAM A. HAMMOND.

APOPLEXY.—*Natural History.*—A disease characterized by the sudden loss, more or less complete, of volition, perception, sensation, and motion, depending on sudden pressure upon the brain (the tissue of which may be morbid), originating within the cranium. The literal meaning of the term apoplexy conveys the idea of a sudden stroke; and it has been usual to limit the term to the results produced by extravasations of blood into the nervous tissue of the brain, a portion of which is thus destroyed. More comprehensive pathological doctrines teach us to give a wider signification to the term. It is now used to characterize a group of symptoms irrespectively of the anatomical conditions upon which they may depend. These symptoms consist of: (1.) Premonitory warnings, extending over variable periods (seconds, weeks, months, or years), marked by sundry derangements of the nervous functions, such as loss of memory, dulness of sensation, or diminished power; (2.) The individual is more or less suddenly deprived of volition and perception in their relation to sensation and motion. Consciousness is thus more or less lost, and paralysis is more or less complete. The patient may fall to the ground completely insensible, or he may only stagger and cling to some object for support. The respiration and circulation may be unaffected, or the former may be stertorous and the latter labored. Some group of muscles, a side of the body, or the whole body, is paralyzed, flaccid, motionless; or it may be rigid with tonic, or convulsed with clonic spasm. From this state the patient may never recover. Life becomes gradually extinguished, or the sufferer may recover partially or entirely; in the former case leaving some mental, motorial or sensorial faculty impaired for weeks, or for the whole of after-life. The essential phenomena of an apoplectic seizure consist in the severance of the brain functions, namely, volition and perception, from motion and sensation: the other symptoms that occur are additional phenomena, depending on secondary changes subsequently induced in the part, or its vicinity, which has been the primary seat of lesion.

The phenomena of the apoplectic state are due to a variety of local lesions, or complex morbid states, and not to any single constant lesion. One or more of the following local lesions or complex morbid states may induce the apoplectic condition, namely: (1.) Functional disturbance of the brain, spasm of vessels, or determination of blood to the head—congestive apoplexy. (2.) Hæmorrhage, or extravasation (*a.*) into the substance of the hemispheres or cerebellum, (*b.*) into the ventricles, or (*c.*) into the arachnoid cavity. One or other of these lesions constitutes apoplexy in the common acceptation of the term—sanguineous apoplexy or cerebral hæmorrhage. (3.) Sudden serous effusion in large quantity is equally efficient in bringing about the apoplectic state commonly called serous apoplexy, as in tuberculous meningitis. (4.) Local cerebritis, or softening of the brain. (5.) Fibroid indurations and tumors of the brain, or meninges, including acephalo-cysts. (6.) The progress of various specific and constitutional diseases from blood-poisoning. (7.) Anæmia, as in the hydrocephaloid disease of children, disease of the heart, and vascular obstructions, such as thrombosis and embolism. (8.) Abscess.

To the phenomena produced by the first three of these conditions only, has it been common or usual to apply the term apoplexy.

In apoplexy from functional disturbance, the face, scalp, and conjunctivæ are increased in vascularity; the skin generally is of a dusky venous hue, and the surface is warm. There is fulness of the jugular veins, with increased pulsation in the carotids. The tongue is foul, and nausea prevails, with constipated bowels. Respiration and the pulse are both labored, and the extremities are cold. The activity and power of the intellect are diminished. General confusion of thought prevails, with deficient memory. Any attempt at mental exercise increases the expression of these signs; so does the absolutely recumbent position and emotional disturbance. Sleepiness, with labored respiration, in common, especially after meals: and there is a general tendency to inaction of body as well as of mind—a "not-to-be-disturbed" sort of desire is experienced. Such mental phenomena, however, are not permanent; and while there is a readily induced state of general confusion, there is no persistent, special, or permanent loss of power of intellect. The senses generally are obtuse. The hearing is dull; and heavy rumbling noises are constant auditory illusions. The sight is dim, or amaurosis is complete, and often black or variously-colored spots are seen floating in the field of vision. Flashes before the eyes, or other spectral illusions, are more or less constant. The patient may see only half of an object, or halves of objects of different colors. Attacks of dizziness also occur, with a sense of fulness and oppression in the head; numbness and weight of the limbs; dull and heavy cephalalgia. There may also be occasional feelings of formication and numbness in certain limbs, momentary loss of memory for some words and figures, or temporary paralysis, confined to certain groups of muscles. These symptoms are only of occasional occurrence, and change their localities. Little jerkings of the muscles, and irregular or sluggish movements of the eyeballs, are occasional.

These precursory symptoms having generally been more intense for a few minutes or hours, an attack takes place, distinctly apoplectic. These "warnings" which precede an attack of apoplexy may, in some cases, depend on occlusion of small vessels, or on small capillary hæmorrhages. Thrombosis and embolism (lesions to be afterwards described) now take a prominent place in cerebral pathology, both as regards cerebral softening and hæmorrhages. By occlusion of a cerebral artery, or of capillaries, clots in blood-vessels are capable of producing apoplectic symptoms, even when the brain substance is otherwise sound. There is always paralysis of motion in the side opposite to the obstructed vessel, general sensibility, as a rule, being unimpaired: sometimes it may be lessened, but is never altogether absent. Loss of consciousness is also less complete, and the mind is less affected after cerebral embolism than after hæmorrhage. Aphasia sometimes happens. The middle artery of the brain is the most frequent seat of embolism, then the anterior, basilar, and vertebral. Apoplectic symptoms, hemiplegia, and death have also followed plugging of the carotid, and of the innominata, right common carotid, and left internal carotid, and middle cerebral.

The seizure commonly occurs during some muscular exertion, such as lifting a heavy weight, pulling on a pair of boots, blowing the nose, straining at defecation, or the like; or even upon a simple change of posture, such as stooping, or suddenly assuming the erect attitude. The manner of appearance and proportion between the three groups of nervous symptoms is of great diagnostic value.

As indicative of functional disturbance, rather than of hæmorrhage or softening, any one of the following combinations of groups of symptoms are of importance to be noticed:—1. The simultaneous development of the three groups of nervous symptoms. There being either—2. Distinct loss of preception, profound coma, and general paralysis, without rigidity or convulsion. 3. Imperfect loss of perception, with general paralysis. 4. General paralysis, incomplete in degree, and sensation unimpaired, or but little affected; or—5. Paralysis complete in degree, but without stertor or rigidity.

The non-existence of precursory symptoms in a given case is in favor of the belief that hæmorrhage rather than functional disturbance is the cause of the lesion or softening.

The more common combinations of symptoms by which the existence of cerebral hæmorrhage limited to the medullary substance might be inferred, are—1. Profound coma, with hemiplegia, of marked intensity, and without rigidity. 2. Paralysis of both sides, but one more profoundly affected than the other—a rare occurrence in limited hæmorrhage. 3. Slight coma, but paralysis hemiplegic and complete.

A large apoplectic clot which destroys the corpus striatum or thalamus opticus, leaves a hemiplegia that never disappears; but small clots in those parts by which nerve filaments are unbroken and ganglionic nerve-cells are unimpaired, and only temporarily pressed apart, leave paralysis, which is only temporary.

Extensive apoplectic clots at other parts of the cerebrum not unfrequently leave paralysis, which sooner or later disappears; the capillaries of the motor centres being relieved of pressure by the partial re-absorption of the extravasation, so become again permeable to blood; or the collateral œdema in the vicinity of the broken-down part of the brain, which extended to the motor centres, disappears with cicatrization and contraction of the apoplectic clot.

Hæmorrhage into the ventricles cannot in some cases be distinguished from arachnoid extravasation, or in others from effusion into the cerebral substance only, especially when in the vicinity of the ventricles. The cases, however, which are less doubtful are marked by coma, which is very profound at the commencement, and remains of equal intensity; or, the patient, after partially recovering from a slight seizure, is again suddenly plunged into profound coma, from which there is no recovery. This second attack is presumed to indicate the rupture of the hæmorrhage either into the ventricles or the arachnoid cavity, from its original site of extravasation in the medullary substance of the brain near the ventricles or near the surface. Paralysis is complete in degree, and is developed simultaneously on both sides; or, after having been hemiplegic for a short time, it becomes general; when the coma of the second attack above noticed comes on, stertorous breathing is strongly marked. Involuntary evacuations follow. The pupils remain dilated. Deglutition is dangerous and difficult. When the paralysis is general and the coma profound, it is almost a sure sign that hæmorrhage has taken place to a considerable extent into the ventricles. Rigidity or tonic contraction of the muscles is present in many cases of hæmorrhage, and in nineteen out of twenty-six cases occurs in the paralyzed lines; and in about four out of twenty-six cases may be seen in those of the healthy side. Its presence is a sign of extensive hæmorrhage with laceration of the brain. The most frequent combination of symptoms indicative of hæmorrhage into the ventricles, may be shortly stated to be profound coma, with general paralysis and rigidity.

Arachnoid hæmorrhage occurs when the extravasation bursts through the pia mater and arachnoid into the space between the membranes, and such cannot be distinguished from the ventricular extravasation just noticed. If, however, the extravasation is immediately subarachnoid at first, and of limited extent, it may be approximately diagnosed,—First, By the nature of the premonitory symptoms having partaken of meningeal inflammation, such as by severe pain in the head, with impaired intelligence and power of movement. Second, The attack is less sudden than in cases of congestion or of central hæmorrhage, and the symptoms are progressively developed.

The following are the combinations of symptoms which indicate the occurrence of subarachnoid hæmorrhage :—(1) Complete and profound coma without paralysis ; or with general paralysis very slightly developed in intensity. (2.) Complete loss of consciousness without paralysis ; but combined with rigidity or clonic contractions of the limbs. (3.) Paralysis of hemiplegic distribution as regards the limbs, but without deviation of the features, the muscles of the face not being implicated. (4.) An apoplectic attack without anæsthesia. (5.) Imperfectly developed coma with general paralysis. (6.) An apoplectic attack, of which the symptoms are somewhat interchangeable or remittent.

The following conclusions have now been arrived at from a comprehensive view of numerous cases :—(1.) That in by far the greater number of cases, cerebral hæmorrhage is due to softness of tissue and small support to vessels ; to degenerations in the form of miliary aneurisms, common in old people, of the cerebral arteries, fatty metamorphosis, or simple atrophy, with the various forms of consecutive dilatation ; while in the larger arteries of the base there is arteritis, issuing in ossification, or fatty degeneration, or passive calcification. (2.) True aneurisms of the large cerebral arteries in a few cases. (3.) Hypertrophy of the left ventricle will only favor cerebral hæmorrhage when it permanently increases the normal tension of the aortal system ; but this is not the case in compensating hypertrophy of valvular disease of the heart. (4.) In about one-seventh of all cases of apoplexy, neither predisposing diseases of the heart nor of the vessels could be demonstrated. The connection of apoplexy with advanced disease of the kidney has occasionally attracted the attention of pathologists. Extremes of temperature are likewise powerful predisponents to apoplexy. The powerful effects of moral causes in producing this fatal disorder are also to be recognized.

Treatment.—The patient, if seen, during the fit, may be bled if the tendency to death is by coma, and the pulse be full, or hard, or thrilling ; if the vessels of the neck be congested, the heat of the scalp increased, and if the blood-vessels of the face be full and turgid. The state of the heart ought to be examined into first. If its action be vigorous, its impulse strong, and its sounds loud but normal, and the heat of the skin preserved, blood-letting is still more required. Slow and deep respiratory movements, with stertor, add greatly to the necessity of immediate venesection, if there be no signs of commencing œdema of the lungs. The beneficial action of the remedy is shown by the pulse becoming softer, more subdued, and more regular. The bleeding may then be allowed to proceed till an obvious impression of this kind is made, or until the pulse begins to flag. Large bleedings, however, are to be avoided. Ten ounces will generally be sufficient, if taken at the first outset of the attack ; but if the pulse does not improve, and other symptoms remain unrelieved, sixteen to twenty ounces may be taken. The indications for blood-letting being thus strongly pronounced, "we ought not to hesitate to open a vein, regardless of the age of our patient." The blood ought to be permitted to flow from a large opening, in order to relieve the congestion, to check, if possible, a further effusion of blood, and to divert its active flow from the head. The quantity taken should be proportioned to the degree of stertor, and to the powers of the patient. The head and shoulders should be raised while the blood is flowing.

If, on the other hand, the pulse be small and slow, feeble, or almost imperceptible, the skin cold and clammy, with a tendency to death by syncope; if the heart's action be feeble or weak, and the pulse irregular; if the patient has been of intemperate habits, or is suffering from organic disease of the heart and arteries; or if there is a gouty or rheumatic history, then no advantage is to be gained by the abstraction of blood at this time and in this way. Blood-letting is therefore contra-indicated, under the following circumstances:—(*a.*) Anæmia, (*b.*) aortic valvular disease, (*c.*) in cases commencing with syncope. In such case the use of stimulants and restoratives must be had recourse to in order to prevent paralysis of the heart.

Blood-letting is never to be adopted as a matter of course.

If the blood-letting is not followed by some degree of consciousness, it may be inferred that the amount of blood effused is considerable, and that the patient, in all probability, will not recover. Still, an additional chance of recovery may be given by applying to the head cold cloths, or crushed ice in a bladder, leeches on the temples, and mustard cataplasms to the feet and limbs; also by placing a drop or two of croton oil on the tongue, and by throwing up a cathartic enema of castor oil or other purgative, or a stimulant enema of turpentine.

Active and searching purgatives generally do good. Five grains of calomel, with a drachm of compound jalap powder, given as soon as the patient can swallow, and followed up by black draught, or by an ounce of sulphate of magnesia with camphor mixture every four or six hours, and continued, according to its effects, for a greater or less length of time, are the best means we have for promoting recovery, and for preventing a relapse.

These medicinal prescriptions are recommended on the supposition that the attack has been associated with simple plethora. In many cases, however, it is a consequence of hypertrophy of the heart, without valvular disease. And in such cases, eight to ten minims of digitalis may be added to each dose of the purgative medicine. If the power of swallowing is in abeyance, then three or four drops of croton oil should be put on the back part of the tongue, and stimulating enemata thrown up the rectum.

The diet of the patient should be low, till all apprehension of a relapse is past—limited to milk, boiled vegetables, light puddings, and fish. At no subsequent period ought he to indulge in a full animal diet, or to drink undiluted wines. At the same time, too lowering a regimen is to be avoided, as thereby the irritability of the system and the heart's action generally are increased. All the cause of the disease already fully referred to should be avoided, counteracted, or overcome. The diet and the bowels should be carefully regulated, and the patient placed under the best possible hygienic influences; mind and body must be kept at rest. A sojourn at the waters of Wildball, Gastien, Pfafers, or Ragatz, often gradually improves patients suffering both from cerebral and spinal paralysis. The induced current of electricity is also beneficial. It seems to improve the nutrition of the paralyzed muscles, which tend to atrophy from long disuse; and paralysis tends to get worse from diminished excitability of the nerves. Local Faradization by induced currents of electricity gives artificial exercise to these muscles, and thereby improves their functional and nutritive properties. Arsenic, quinine, iron, cod-liver oil, phosphatic syruos, and hypophosphites are the most useful tonics.—WILLIAM AITKEN.

APPENDIX VERMIFORMIS, Abscess of—*See Perityphlitis*

ARACHNITIS, Cerebro-Spinal—*See Cerebro-Spinal Fever.*

AREA—*See Alopecia.*

ARTERIES, Ligature of.—Arteries are tied either in the continuity or at a point wounded or severed. 1. *Ligature in the continuity.*—Operation generally done at a point selected, 1, because it is not too near a diseased part of the vessel (*e. g.*, an aneurism); 2, it is not so far off an aneurism that collateral circulation would at once nullify the operation; 3, it is not close to the origin of a large branch, the rush of blood through which would prevent coagulation and secondary hæmorrhage. *Operation.*—Learn well the superficial and deep landmarks, and the anatomy of the part. Mark out the vessel's course. Incise the skin and superficial fascia equally and sufficiently. A director may be used for the deep fascia. Avoid superficial veins; avoid opening sheaths of muscles. "The surgeon should not at the commencement occupy himself with looking for the artery, but should seek the first marked point of guidance, then the second, then the third, and so on to the end" (Bryant). Handle of knife will push muscles, etc., aside. Retractors. Feel artery pulsate. Opening in sheath to be small, and made with knife-blade held on a plane just superficial to the artery, that is "on the flat." Insinuate aneurism-needle round artery. Draw out ligature with forceps. In tying, press down knot with tips of forefingers; do not lift vessel from its bed. Cut one end of a silk ligature short, and both ends of a catgut one. Close wound and dress. Before actually tying ligature, make sure that you have surrounded the artery, the whole artery, and nothing but the artery. Needle should be passed between the artery and its vein. *Process of repair, etc.*—The two inner coats are divided by the ligature and retract a little. A clot forms up to the nearest branch. Lymph is effused around the ligature. In the most favorable cases, the lymph and the clot organize; and the cut arterial coats grow together, so that when the outermost coat is ulcerated through, a new barrier has been formed against hæmorrhage. But these processes may wholly or partially fail. Then there is more or less danger of secondary hæmorrhage. *Dangers.*—Secondary hæmorrhage from above cause, or from suppuration. Gangrene, from non-establishment of collateral circulation, from injury to, and consequent coagulation in, the vein, or from suppuration of an aneurismal sac. Erysipelas and other accidents to which all wounds are liable. 2. *Ligature of an artery open in a wound.*—Be careful not to include neighboring nerve. Reef-knot. Hemp, silk, and catgut ligatures. Carbolized catgut is absorbed or organized, and scarcely, if at all, acts like a foreign body in the wound. One end of a hemp or silk ligature must be left hanging out of the wound.

Axillary.—Very rarely tied. Line of artery. From just internal to coracoid process, curving outwards and downwards to commencement of brachial artery. Divide skin and pectoralis major. Beware of vein and brachial plexus.

LIGATURE OF SPECIAL ARTERIES.—*Abdominal Aorta.*—1st method; incise the abdominal wall as in ovariotomy. Divide the peritoneum covering the aorta, and pass the ligature. 2nd method: make an incision like that for ligature of common iliac, and proceed as if for ligature of that vessel, but keep a little higher. Doubtful whether operation is ever justifiable. For details, *vide* larger works.

Brachial.—In middle of upper arm. Line of incision, inner edge of biceps. Avoid basilic vein and internal cutaneous nerve; open deep fascia; look out for median nerve; artery usually lies just beneath it, but may be superficial to it. Remember occasional high division of brachial.

Carotid, Common.—Position: head back, face turned away at first. Place of selection—just above omo-hyoid (*i. e.*, level of cricoid cartilage). Line of artery, sterno-clavicular articulation to midway between mastoid process and angle of jaw; incise skin along anterior border of sterno-mastoid three inches; platysma; deep fascia. Raise head, relax and retract sterno-mastoid; look for omo-hyoid; carotid sheath with descendens noni. As a rule, jugular vein and vagus nerve not seen. 2. In tying artery low down, divide partially sterno-mastoid, sterno-hyoid, and sterno-thyroids. *Fatality.*—40 per cent.; in ordinary cases one in three. When operation is for hæmorrhage, 56 per cent. die. When for aneurism, on Brasdor's method, only one in four. For affections of the nervous system, only one in thirty-four. *Chief Dangers.*—Brain symptoms aud secondary hæmorrhage.

Carotid, External and Internal.—Ligature of common carotid prefer

For external carotid proceed as follows: line of incision same as for common carotid; incision from angle of jaw to thyroid cartilage; freely incise any glands which may be in the way; tie and divide cutaneous veins; look for hypoglossal nerve; tie the artery between origins of supra-thyroid and lingual arteries.

Femoral.—The common femoral rarely tied; ligature of external iliac preferred. Incise in line of artery; crural branch of genito-crural nerve; open sheath; tie about one inch below Poupart's ligament; pass needle from within outwards.

Superficial Femoral tied in two places: 1. At apex of Scarpa's triangle. Position: abduction and rotation outwards; knee flexed; line of artery, from middle of Poupart's ligament to front of inner condyle; incise skin 3 to 4 inches at junction of upper and middle one-thirds of thigh; divide fat; avoid saphena vein; divide fascia lata well to inner side of sartorius, so as not to open sheath of that muscle; retract sartorius outwards; feel for sheath of artery; branch of ant. crural over sheath; open sheath; clean artery with point of director; pass needle from inner side. 2. In Hunter's canal. Done when operation in Scarpa's triangle fails. If done at lower end of Hunter's canal, draw sartorius to inner side; incision in the same line as when artery is tied in Scarpa's triangle, but longer, and of course lower down thigh. Other steps similar to first operation. *Fatality.* One in four. Syme was successful twenty three times in succession.

Iliac, Common.—Line of artery; from half-inch to left of umbilicus to middle of Poupart's ligament. Incision, from end of last rib downwards and forwards to crista ilii, and then forwards above and parallel to crest of ilium as far as anterior superior spine; divide muscles and transversalis fascia, using finger as a director? roll up peritoneum and intestines out of way, and tie artery. Second method; incise skin first from outside internal abdominal ring, parallel to Poupart's ligament, three or four inches towards ant. sup. spine of ilium; then continue incision with a curve inwards towards umbilicus, and proceed with muscles and transversalis fascia much as in first method. Remember relation to veins, ureter, and spermatic vessels. *Fatality.*—Very great—twenty-five in thirty-two! Chief causes: exhaustion and hæmorrhage.

Iliac, External.—Line of artery same as common iliac. Incise skin half an inch above Poupart's ligament from just external to internal abdominal ring outwards in a curve three inches long, and parallel to the ligament; divide muscles and transversalis fascia carefully; push up peritoneum; separate artery from vein; pass needle from within outwards; the higher up the artery is to be tied, the farther must the outer end of the incision be extended upwards and inwards, the incision thus becoming like that for the common iliac. Beware of seven dangers: 1, wound of epigastric artery; 2, wound of spermatic cord; 3, laceration of peritoneum; 4, puncture of external iliac vein; 5, of circumflexa ilii vein; 6, ligature of genito-crural; 7, too free disturbance of sub-peritoneal cellular tissue. *Fatality.*—One in three. Chief causes: gangrene, hæmorrhage, and peritonitis.

Iliac, Internal.—Steps of operation as for common iliac. Trace internal iliac from bifurcation of common iliac; scratch artery clean with finger-nail and director; pass ligature three-quarters of an inch from origin. Beware of ureter, vein, and peritoneum. *Fatality.*—One in two.

Innominate.—Incision, along anterior border and sternal end of sterno-mastoid, divide as much of sterno-mastoid as may be necessary to expose carotid, and trace carotid downwards to innominate. *Fatality.*—Only one case has recovered. In it the carotid and vertebral were also ligatured (Smyth's case).

Lingual.—Line of artery; just above greater cornu of hyoid bone; incision horizontal, with centre opposite end of greater cornu of hyoid bone;

look for hypoglossal nerve, artery crosses beneath it; divide hyo-glossus muscle from hyoid hone; artery is thus exposed. *Object.*—Usually to check hæmorrhage from centre of tongue.

Radial.—Line of artery; from inner side of biceps tendon at bend of elbow to half an inch internal to styloid process of radius. Ligature in upper third: incision in line of artery. Separate supinator longus from pronator teres, and tie. Lower third: divide skin and deep fascia to outer side of flexor carpi radialis.

Subclavian.—Tied only in third part of its course. Raise patient on a pillow, head back, face turned away, arm pulled down; incise along clavicle, pulling skin down over it; divide border of sterno-mastoid if necessary; deep fascia; retract external jugular; separate vessels and cellular tissue beneath deep fascia without using knife-blade; feel for scalene tubercle aad scalenus anticus. Subsclavian lies behind them; brachial plexus and subclavian vein; pass needle from below upwards. *Fatality.*—Nearly one in two. Chief causes: hæmorrhage, gangrene, intra-thoracic inflammation, "sloughing or suppuration of aneurism."

Tibial, Anterior.—Line of artery; from head of fibula to midway between two malleoli. Upper or middle third: divide skin in line of vessel; look for a white line in deep fascia, marking outer border of tibialis anticus; divide the line and separate tibialis anticus from ext. long. dig. above, and from extensor prop. poll. below; nerve superficial; patient should put tibialis anticus into action before anæsthesia. Lower third: artery nearly superficial.

Tibial, Posterior.—Upper half: two methods—1 (Guthrie's), perpendicular incision, six inches long, through middle of gastrocnemius, soleus, and deep (submuscular) fascia; artery lies on tibialis posticus; nerve crossing superficially and obliquely from within outwards. 2nd method: incision three-quarters of an inch behind and parallel to posterior border of tibia, down to tibial origin of soleus. Separate soleus from bone, divide submuscular fascia, and find artery immediately beneath it.

Near Ankle.—Artery lies beneath thick deep fascia, rather nearer malleolus than heel. Incise over it.

Ulnar.—Line: from middle of bend of elbow, curving inwards slightly, to outer side of pisiform bone. Upper half: incise obliquely over course of vessel and well to inner side of arm; find outer border of flex. carpi ulnaris; divide it from flex. sublimis, and find artery between superficial and deep flexors; inner border of flexor sublimis may be found in thin people by putting that muscle in action.

Above Wrist.—Divide skin and deep fascia just outside tendon of flex. carpi ulnaris. Nerve on the inner side.—C. B. KEETLEY.

ARTERITIS AND ATHEROMA.—Inflammation of the textures of arteries is a disease by no means rare; and the results are grave and serious in proportion to the region where arterial inflammation occurs, especially in connection with the changes known by the name of atheroma, which are known to be "in continuity with arteritis' and to graduate from a condition in which no inflammatory results can be found into one in which inflammation is unmistakably present. Chronic endarteritis commences with relaxation and infiltration of the texture of the artery. A murmur is appreciable in aortitis—a loud, rough, systolic bruit—due to the passage of blood over the rugous and unpolished surface of the inner membrane. So long as aneurism does not occur, nor rupture or stoppage of one of the smaller vessels by the formation or arrest of a clot of fibrine, there may be few or no symptoms to indicate chronic inflammation. But if the results of chronic arteritis are extensive, especially in the form of atheroma, the demands upon the heart become increased, and cardiac hypertrophy may arise. If the inflammation spread from the arterial walls to the valves, insufficiency and stenosis may result. If insufficiency of the aortic valves occur, the hypertrophy, if existing, may not be maintained, from failure of or imperfect supply of blood through the coronary arteries, and so degeneration of the substance of the heart may result. Then follow all the usual symptoms of retarded circulation, with overloading of the venous system—cyanosis, dropsy, and suppression of urine. Evidence of disease in the peripheral arteries warrants the belief that arteritis may also be present in a more advanced stage of development. Rheumatism, gout, and syphilis are the most common causes.—WM. AITKEN.

ARTHRITIS, Acute—*See Acute Rheumatism.*

ARTHRITIS, Rheumatoid—*See Chronic Osteo-Arthritis.*

ARTHRODYIA—*See Chronic Rheumatism.*

ASCITES.—*Natural History.*—A collection of serum, as a result of chronic peritonitis, slowly effused by transudation into the cavity of the peritoneum, is a form of dropsy. If the fluid effused be considerable, the abdomen is distended and the skin shining, with large superficial veins creeping over its surface. From the weight of the fluid, the gait of the patient is upright, like that of a pregnant woman; and if anasarca be present, he walks with his legs widely apart. In bed he is unable to lie down, on account of the fluid gravitating towards the chest and compressing the lungs, so that he is obliged to be raised towards the head and shoulders. The upper portion of the body is in general greatly emaciated, the sharp and pinched features and the withered arms forming a striking contrast to the protuberant abdomen and perhaps swollen legs. The urine may be defective in quantity, the skin dry, and the patient thirsty, his appetite greatly impaired, and his spirits generally greatly depressed. The presence of fluid in the abdomen is determined by percussion. Place one hand on the abdomen, and give a sharp but gentle tap on the opposite side with the fingers of the other, when, if water be present, a fluctuation will be felt. If the quantity of fluid be small, the fluctuation is best felt by percussing the side of the abdomen from before backwards. So long as the effusion is moderate, the shape of the belly will change with every position of the body. If standing the lower part of the belly is prominent—if lying down, it is broad. The cause must be investigated as to whether ascites is due to—(1.) Disease of the heart, (2.) disease of the liver, (3.) disease of the kidney.

Treatment.—When no albumen exists in the urine, bitartrate of potash, administered in divided doses—one drachm three times a day, or every six hours, or in one large dose, as half an ounce, combined, if the patient's bowels be confined, with ten or fifteen grains of jalap; or, compound jalap powder may be given alone. When smaller doses are used, it may be useful to add ten grains of the citrate or tartrate of iron to each dose. If these remedies should fail, one-sixth to half a grain of the extract of elaterium every night, or every other night, may be given. When ascites is accompanied with anasarca squills afford most relief; and by giving five to eight grains of pulvis scillæ three times a day, the dropsy is generally relieved. If the stomach be irritable, half a grain of opium should be added to each dose. When ascites arises from disease of the heart, the kidney being sound, and the urine free from albumen, treatment must have reference to the nature of the heart disease. An ounce and a half of camphor mixture, with a drachm of the spirit of nitrous ether, fifteen minims of the tincture of hysocyamus and a drachm of the sulphate of magnesia will form a draught which, taken three times a day, will often greatly reduce the dropsy. So also will tincture of squills (m x. to m xx.), with a drachm of the acetate of potash. Rubbing the biniodide of mercury in the form of an ointment, on the skin over the region of an enlarged spleen has a very marked beneficial effect in reducing the enlargement. The ointment is to be rubbed into the skin while the patient sits before a strong fire, or in the rays of an Indian sun. The dropsy which often occurs in young chlorotic women in whom the urine contains albumen (the kidney being healthy in structure though disordered in function), is generally curable,—the most efficient remedy being the bitartrate of potash in drachm doses three times a day. It acts as a diuretic and as a purgative.—WILLIAM AITKEN.

ASPHYXIA.—*Causes.*—1, Compression of chest; 2, compression of lungs by air in pleura; 3, traumatic compression of trachea, as in garotting; 4, foreign body in air passages; 5, immersion in some fluid, including (*a*) water (drowning), (*b*) some inert gas, (*c*) some poisonous gas; 6, disease, including (*a*) pressure by aneurism, œdema glottidis, accumulation of mucus, &c., (*b*) paralysis of respiratory muscles. Hanging may be classed with cause 3. Appearances—Lividity, swelling of face, perhaps bleeding from nose or mouth. Post mortem; engorgement of right side of heart, emptiness of left side of heart; arteries contain venous blood; abdominal viscera engorged; lungs not peculiar when there has only been mechanical obstruction; but in drowning they are filled with frothy water, doughy and heavy, and the air-tubes are choked with frothy and bloody water and mucus. Brain sometimes hyperæmic, especially after hanging or suffocation. *Prognosis.*—Almost hopeless after five minutes' submersion. Remember, a person may be immersed some time without being submerged. Recovery has taken place after three-quarters of an hour of asphyxia (Weeks). Prognosis much worse if water has got into the lungs.

Treatment.—In drowning, hold the patient's head downwards for a few seconds to begin with. In hanging or choking, bleed from jugular. If there is obstruction to passage of air through mouth or nose, open trachea. Then, friction, warmth, warm bath (100°), ammonia to nostrils; but begin at once artificial respiration, and continue it. Artificial respiration by 1, inflation from mouth to mouth; 2, bellows; 3, split sheet; 4, Marshall Hall's method; 5, Sylvester's; 6, Howard's; 7, inhalation of oxygen; 8, galvanizing phrenic nerve. With bellows, 15 cubic inches should be introduced 12 times a minute. Oxygen was successfully administered after three-quarters of an hour's asphyxia, in Weeks' case.

Sylvester's Method.—Lay body on back, on a plane inclined slightly towards feet; cushion under head; head in line with trunk; tongue drawn forward; grasp arms just above elbows and draw upwards till they nearly meet above head; there retain them for two seconds; then depress them again and press them firmly for two seconds against the sides, combined, if possible, with pressure on lower part of sternum; repeat about fifteen times per minute. Remember, artificial respiration is to be attended to the first thing; warmth and friction are secondary; the endeavors should be kept up for at least three or four hours, even without any encouraging signs.

In hanging, besides asphyxia, there is usually some apoplexy as well as injury to the spinal cord.—C. B. KEETLEY.

ASPIRATION.—The aspirator is an exhausting syringe, used for drawing off fluids without admitting ingress of air, and in exploring for purposes of diagnosis. The needle should be pressed in with a screwing motion, and the taps should be managed carefully and without hurry.

ASTHMA, Spasmodic.—*Natural History.*—A disease which culminates in paroxysmal attacks of difficult breathing, of longer or shorter duration, is so named. The dyspnœa seems to be immediately dependent on more or less extensive contraction of the smaller bronchi, and due to tonic spasm of their circular fibres. Breathing is accompanied by a wheezing sound, a sense of constriction in the thorax, great anxietas, and a difficult cough. The attack usually terminates by the expectoration of a quantity of mucus from the lungs, which varies considerably in appearance and in amount. In some instances the mucus is thick and heavy, in others it is light and frothy, whilst in the severer forms of the disease there may be only a few dark pellets coughed up before relief is obtained. In the hours immediately succeding the fit a remarkable diminution of the urea and chloride of sodium may occur, which would imply a considerable arrest either of formation or elimination, probably the former, or to the starvation that is generally enforced at that time. Not unfrequently asthma has been confounded with dyspnœa; and the terms dyspnœa, asthma, and orthopnœa, were formerly employed to designate different degrees of difficulty of breathing. There are many good reasons for regarding asthma as a general or constitutional disease, rather than a merely local one of the respiratory organs; and it is believed by not a few to be connected with the gouty or rheumatic diathesis. The disposition of the attacks to recur at distant but gradually diminishing intervals; the division of each attack into nightly paroxysms, with marked remissions during the day; the duration of the earliest fits for several days or a week, are all circumstances which point to the constitutional nature of the affection.

The exciting causes of the paroxysms are mainly due to fatigue and physical exhaustion—sudden or violent mental emotion—certain conditions of the digestive organs—gastric irritation—the irritation of a loaded rectum—irritation of an eruption on the skin and its sudden subsidence—the irritation of certain substances and articles of food, such as cheese, nuts, almonds and raisins, sweet things generally, salted meats, condiments, preserved and highly-seasoned foods, fermented liquors, especially malt liquors, and sweet wines.

All true asthma is spasmodic, and on inspecting the chest of a patient laboring under a severe paroxysm, the whole upper part seems almost motionless, while the inferior portions are acting within a very confined range. All the muscles passing from the head to the shoulders, clavicles, and ribs are rigid. The abdominal muscles, however, act most powerfully to increase the capacity of the chest, and its walls are kept fixed in a condition of extreme inspiration. The chest is enlarged in every way, the diaphragm descends, the abdomen seems fuller, and its girth is increased. The stethoscope teaches us that the whole of the lungs, but particularly the posterior lungs, are laboring with a loud and deep sibilous sonorous wheeze, accompanied with a mucous rattle, sometimes loudest on inspiration and sometimes on expiration. No respiratory murmur exists. Dry tube sounds alone are heard—rhonchus and sibilus of every variety, note, and pitch. There is complete stagnation of air in the chest. The sounds are so small that they seem to indicate spasmodic constriction of the smaller tubes; and the universal diffusion of the sound shows that the constrictions are universal. These spasms may also be observed to be constantly disappearing in one place and making their appearance in another, so that the sounds are continually changing their character and their site. Percussion shows that the lungs are distended with air; and should an air-cell have burst, a rubbing sound will be heard, denoting the effusion of air into the cellular substance of the lung. As the fit subsides, the respiration becomes puerile, and by degrees the breathing returns to its usual state. In fatal cases the respiration becomes tracheal, slight hæmorrhage perhaps takes place, and after a severe struggle the patient dies; although death rarely takes place immediately from uncomplicated asthma. In some cases the fit lasts a few minutes, in others two or three hours; the whole night; three or four days; and in others as many weeks.

Treatment comprises what should be done during the fit, and what should be done during the intervals, with a view to correct the obvious constitutional state, which every now and then culminates in a paroxysm of asthma. When the patient is laboring under a fit, our efforts must be directed to tranquillize his suffering and shorten the attack. Any stomachal exciting cause actually present and in operation must be removed by an emetic; an undigested meal or constipation must be got rid of or relieved by an enema. The patient should be supported by strictly tonic regimen ; and camphor mixture, to the extent of about an ounce and a half, combined with a drachm of the spirit of nitrous ether and some morphia or tincture of hyoscyamus, may be given every hour, or every two hours, for a short time. In some cases asafœtida, castor, musk, or dilute hydrocyanic acid, to the extent of m iij. every six hours, may be substituted. If the fit should occur after a hearty meal, and after an emetic has been given, the tincture of rhubarb or the sulphate of magnesia should be continued in repeated small doses. If the attack be prolonged, arrow-root or sago, with small quantities of wine or brandy, may be necessary to support the patient under his laborious and exhausting sufferings. Ipecachuanha, tartar emetic, codeia and tobacco are the drugs which most rapidly relax spasm as direct depressants. There is, however, great danger in the use of the latter, from unmanageable and dangerous collapse. Ipecacuanha is the most manageable of these remedies, and ought to be given in a dose of twenty grains at the onset of the paroxysm. The tobacco should be smoked from a pipe.

But it is the treatment during the interval which is all-important. The diet ought to be strictly prescribed. The amount must be regularly weighed out, and adhered to with the greatest strictness, the hours of meals being most rigidly fixed as follows:—Breakfast at eight A. M., to consist of half a pint of green tea or coffee, with a little cream, and two ounces of dry stale bread. Dinner at one P.M., to consist of two ounces of fresh beef or mutton, without fat or skin, and two ounces of dry stale bread or well-boiled rice ; three hours after dinner (not sooner) half a pint of weak brandy and water, or whiskey and water, or dry sherry and water, may be taken, or toast-water *ad libitum*. Supper at seven P.M., to consist of two ounces of meat as before, with two ounces of dry stale bread. The patient is not to be allowed to drink any fluid whatever within one hour before his dinner or supper, and not until three hours after either of these meals. At other times he is not limited as to drinks, otherwise than that all malt liquors are to be prohibited. Soda or seltzer-water may be indulged in at other times when thirsty. With this dietetic treatment sedatives are to be given as follows :—Three grains of the extract of conium are to be taken four times a day—namely, at the hours of seven, twelve, five and ten,—the dose to be gradually increased to five grains four times a day. To each of these pills a fourth of a grain of the extract of Indian hemp may be added, which may be gradually increased to one grain in each dose.—WILLIAM AITKEN.

ASTHMA, HAY—*See Hay Asthma.*

ASTIGMATISM—*See Refraction.*

ASTRAGALUS, Dislocation of—*See Dislocations.*

ASTRAPHOBIA—*See Fear, Morbid.*

ATELECTASIS occurs in infants congenitally ; the respiration of such infants is feeble, and even intermitting ; they wail, but do not cry ; they show difficulty in sucking ; they are cold and livid, with weak pulse. The disease is simply a portion of lung uninflated ; oftenest it is the inferior and posterior portions of the right lung that are so affected. The lung itself is dark red in color, without crepitation, exuding no bubbles, but sanguineous serum ; it sinks in water. The cause is defective nerve en*ergy from pressure. The treatment is tappings* and frictions before the cord is cut, to ensure thorough expansion of the lungs. Nevertheless, if the first difficulties be overcome, such a child often remains weak, unable to suck properly, with a whining feeble cry, perhaps jaundiced, and with poor and very incomplete respiratory action. The general surface is cold. I think it best to wrap such infants in cotton-wool in order to maintain artificially the warmth so much needed. Besides this, stimulating embrocations, such as—

℞ Ol. Amygdal. Dulc.................................. ℥ ss;
Ol. Caryophyl... ʒ ij;
Ol. Succini.. ʒ ij.
Ft. embrocatio.

are useful. A few drops of brandy, or aromatic ammonia, may be administered as medicine. Such children are often unable to suck, and must have the mother's milk drawn off and be fed therewith by a spoon. If, however, the disease be extensive, it often ends fatally. The acquired form of this disease is met with oftenest in children about two years old; it is characterized by a hacking cough, dyspnœa, palpitation, epistaxis, melæna, and during inspiration the ribs are drawn inwards and sternum forwards; percussion is dull over the diseased parts. Atelectasis is regarded by many writers as being identical with carnification seen in lungs affected by pneumonia; others consider that it is merely a fœtal condition of the lung remaining for a while undiscovered, and that therefore the disease is never truly acquired. There seems, however, no reason to doubt that long-continued and violent crying is a not unfrequent cause of atelectasis. This crying may have its origin in a wind-spasm or colic from dyspepsia, or in mere temper. The respiratory muscles becoming wearied and exhausted, the chest no longer expands properly, as in normal breathing; portions of the lung receiving an insufficient amount of air, collapse; and in the portion thus collapsed the blood vessels become turgid and obstructed; the right side of the heart becomes overloaded; a deficient supply of arterial blood is sent forth, and hence coma, convulsions, and death may readily ensue. More often, however, such is not the case; the child slowly recovers. In cases where collapse of the lung has been extensive, and has partly persisted without proving fatal, organic disease of the heart has been observed to follow by both Weber and Steffen. In such cases cyanosis may be looked for as a possible and probable complication. The treatment of such cases demands careful attention to hygiene, especially to ventilation, warmth, clothes and food. Stimulating expectorants, as ammonia and senega, are useful; so also are stimulating embrocations over the affected surface. It is important that the child should observe a recumbent posture, "to antagonize," says Dr. Rees, "as far as possible the altered movement, and give the best chance for the uninflated lung again to expand." Vogel thinks highly of the cautious use of electricity applied to the pectoral muscles.—E. ELLIS.

ATHEROMA.—*See Arteritis.*

ATHEROMATOUS TUMORS.—*See Tumors* (*Cysts*).

ATHETOSIS.—*Derivation.*—*Athetos,* without fixed position.

Definition.—Continual motion of the fingers and toes and inability to retain them in any position in which they may be placed.

Cause.—In all probability it is caused by degenerative changes in the ganglionic masses of gray matter of the optic thalamus or corpus striatum.

Symptoms.—Epileptic paroxysms, tremulousness of the tongue, numbness on the affected side, pains in the spasmodically affected muscles, especially complex movements of the fingers and toes with a tendency to distortion, dazzling before the eyes, dimness of sight, giddiness preceding loss of consciousness and followed by loss of speech and sensation, and motion of the right side.

Prognosis.—By treatment the symptoms may be ameliorated. As regards cure the prognosis is unfavorable.

Treatment.—So few cases have been observed and so little is known of the exciting causes of this disease that the treatment must be mainly symptomatic, the primary galvanic current to the brain, spinal cord and affected muscles, bromide of potassium, phosphoric acid, cerium, cannabis indica, and tonics as sulphate of quinine and iron have been emploved with some degree of success.—B. W. PALMER.

ATROPHIA CUTIS.—Atrophy of the skin, besides occurring as a result of various inflammatory affections or new growths of the skin, is met with as an independent disease, both in a general and a partial form.

The first condition is usually a result of retrogressive or degenerative changes in old persons, and has been called senile atrophy.

In it the skin becomes dry, wrinkled, rough, less supple, and more or less pigmented. The epidermis is smooth, or in places branny, the cutis and its papillæ are thinned and wasted, and the subcutaneous fatty tissue is usually atrophied. Hairs are scanty or wanting, and the sebaceous glands either atrophied or presenting degeneration in the form of milium granules. Anatomically the tissues may be found either in a condition which is mainly that of simple atrophy, or, in addition, more or less marked degenerative metamorphoses are present.

In the former condition of simple atrophy the cuticle is thin and the papillæ either wanting or projecting very slightly above the level of the corium. The corium meshes are thin, narrow, and contain few small corpuscles and very little interstitial fluid, while granular pigment, diffuse or in masses, is abundant. The fat cells are wasted, and contain vacuoles in places instead of oil globules. The vessels are thin, atrophied, and pigmented in some places, but varicose in others, and the hair follicles, though present, have their papillæ wasted and contain no hairs, or only their lanuginous filaments.

In the degenerative conditions, in addition to the simple atrophy, the skin, in tracts of varying extent, becomes brittle and extremely thin, while its connective tissue bundles become converted into a vitreous or gelatinous mass, in which no vessels or nerves are visible. The hair and glandular follicles are also degenerated. The process is supposed to begin in the arterioles, like albuminoid degeneration, and to spread thence to the other tissue.

Partial atrophy of the skin is observed in the form of white scarlike parallel bands, a half to two lines broad and several inches long, or in scattered round maculæ, a quarter to two lines in diameter.

The striæ (linear atrophy) which are the most common have a glistening bluish-white appearance,and the skin forming them is unduly thin and depressed. They usually occur on the pelvic brim, the glutei, and the trochanters, and less frequently on the fronts of the thighs or the arms. Under the miscroscope the papillary layer is found atrophied, the corium much thinned, with its bundles delicate and its vessels fewer in number, and the subcutaneous fatty tissue and appendages are wasted.

The maculæ are much less frequently observed, but Dr. Liveing has found the following changes to occur in them: The spots, at first somewhat reddish, raised above the skin, hard and fibrous, passed on into the ordinary atrophic condition, appearing as discrete round or oval pitlike scars, covered by a thin membrane, and all about the size of a threepenny-piece. *Finally a stage of contraction or obliteration* sets in, and the spots *become less apparent, as if encroached* upon by the surrounding healthy tissues. Liveing believes this disease to be allied to scleroderma and morphœa, with which it has been several times associated.—MALCOLM MORRIS.

BACK, Sprains of.—Usually occur in neck or loins, often affect intervertebral ligaments; tumefaction, rarely ecchymosis, stiffness, tenderness; in severe cases, patient lies on his side, semi-flexed; hæmaturia when the kidneys are hurt; occasionally symptoms of paralysis; if such persist, intravertebral hæmorrhage, inflammation of the meninges, or injury to the cord are indicated. *Causes.*—Falls on head or buttocks, railway collisions, Rugby football, &c. *Diagnosis.*—From fracture or dislocation, line of spinous processes straight; tenderness more or less diffuse; patient can probably, though with pain, raise himself into the erect position, straightening his spine. *Prognosis.*—Good, even when there is hæmaturia; even severe paralysis sometimes passes off in a day or two, but danger of inflammation spreading to meninges of cord. This danger is greatest in atlo-axial region. *See* Spinal Meningitis, Fracture, Hæmorrhage, &c. *Treatment.*—Rest. *See* Sprains.—Actual cautery and Corrigan's Button or Sayre's Jacket in obstinate cases.—C. B. KEETLEY.

BALANITIS.—Inflammation of glans penis or lining membrane of prepuce. *Causes.*—Gonorrhœa, phimosis, dirty habits, ill health. *Treatment.*—Warm water, zinc ointment, astringent lotions, nitrate of silver. A chancre may coexist.

BALDNESS—*See Alopecia.*

BAKER'S ITCH is a term which includes lichen agrius and chronic eczema of the hands. It is induced by the irritant action of the flour used by bakers, in debilitated subjects especially (*see* Eczema).

Treatment.—Patients are often considerably out of health, and have a loaded system, though they are debilitated. For such the following may be given.

℞	Sulphate of magnesia	ʒ iij.
	Sulphate of iron	gr. xij.
	Dilute sulphuric acid	ʒ ss.
	Infusion of quassia	q. s. ad. ℥ viij.

Dose, one sixth part twice daily. Quinine may be added if desired; and this is to be followed by tonics, such as.

℞	Hydrochloric solution of arsenic	ʒ ss.
	Dilute hydrochloric acid	ʒ j.
	Tr. chloride of iron	ʒ iss to ʒ iij.
	Water	℥ viij.

Dose, a sixth part three times a day. Locally the part may be first soothed by the linimentum calcis, and afterwards when the inflammation is subdued, the following may be employed.

℞	Pyroligneous oil of Juniper	ʒ i to ʒ j.
	Mutton suet	ʒ ss.
	Lard	℥ i.

Epitome of Skin Diseases.—Dr. T. Fox and F. C. Fox.

BARBADOES LEG—*See Elephantiasis Arabum.*

BED-SORES attack the skin over hard prominences, *e. g.*, sacrum' ischial tuberosities, trochanters, condyles of knees, elbows, and the heels First the skin reddens, then an abrasion may form, then a slough; in bad cases even spinal canal may be opened. *Causes.*—Predisposing are debility, continued fevers, especially typhoid, paralysis, old age; exciting causes are continued pressure, irritation of fæces and urine, the under sheet and night-shirt not being kept smooth by the nurse, &c. *Prognosis.*—Depends chiefly upon whether the cause can be removed or not. *Treatment.*—Preventive measures are good nursing, dry, smooth drawn sheats, water beds or cushions, frequent change of position. The buttocks, &c., should be rubbed twice a day for five minutes with camphorated spirit, or with a mixture of olive oil and brandy (equal parts); or bathe the part with hydrarg. perchlor. in sp. vin. rect. (gr. ij.–℥j); prominences should be covered with amadou plaster; when an abrasion forms, apply collodion and try to take off the pressure; when a slough is forming, use stimulants, *e. g.*, resin ointment, balsam of Peru on cotton wool. Prone position sometimes necessary.—C. B. KEETLEY.

BEES, STINGS OF.—*Treatment.*—Rubbing with olive oil, strong liquor ammoniæ, indigo, eau de Cologne, vinegar, flour, &c.; remove the sting if it can be found; ice.

BERI-BERI.—*Natural History.*—A disease expressed in the first instance by anæmia, culminating in acute œdema, and marked by stiffness of the limbs, numbness, and sometimes paralysis of the lower extremities; oppressed breathing (anxietas in paroxysms); a swollen and bloated countenance. The urine is secreted in diminished quantity. The œdema is general, not only throughout the connective tissue of the muscles, but the connective tissue of solid and visceral organs in every cavity of the body is bathed in fluid. Effusion of serum into the serous cavities very generally precedes death.

This obscure but very fatal disease is little known to pathologists in this country. Though common in various parts of India, the territorial range of its endemic prevalence seems limited in a peculiar manner to the Malabar coast, to Ceylon, and to that tract of country reaching from Madras as far north as Ganjam. It is principally endemic in that portion of Hindoostan called the Northern Circars—a province lying on the west side of the Bay of Bengal, extending from 15° to 20° north latitude. Madras, in north latitude 13° 6′, appears to be the southern limit of the disease in Hindoostan. Towards the north of Madras, in the jails of Guntoor, Nellore, Masulipatam, Rajahmundry, Vizagapatam, Chicacole, Bellary, and Caddapah, the disease is known to prevail. Towards the south it is never seen. It is said to extend from the coast not farther inland than forty to sixty miles. It is regarded by Dr. Paterson of Bahia (where it was very fatal during the year 1872) as an affection of the sympathetic system.

Next to cholera, beri-beri must be regarded as the most fatal disease to which Europeans in India are liable. Mussulmans appear to be more subject to the disease than Hindoos, and the rate of mortality is nearly twice as great among Europeans as it is among the natives.

A residence of several months in a district where the beri-beri prevails is necessary to its development; and the greatest predisposition to the disease exists after about eight or ten months' residence in a settlement.

The majority of the phenomena which characterize the well-recorded cases of this disease are undoubtedly referable to anæmia. The debility, the cold extremities, palpitation, dyspnœa on exertion, frequent, small and quick pulse, the bruit occasionally heard in the neck, the scanty urine, the torpid bowels, the deadly pallor of the tongue, all indicate a condition of anæmia. The disease makes its advances in an insidious manner, as all forms of anæmia do, without any primary or well-marked train of symptoms; and the indisposition appears to be comparatively slight which exists as a stage precursory to the visible invasion of the fully expressed disease. The approach of the final and characteristic features of the disease appears to be very gradually brought about.

Treatment.—Judging from the pathology of this disease, the constitutional influence of stimulants, generous diet, and tonics, ought undoubtedly to be the basis of treatment. Should there be irritability of the stomach, effervescing draughts, with doses of laudanum and camphor mixture, are useful. Saline drinks should be administered, and the extremities should be rubbed with stimulating liniments and rolled in flannel bandages. In the asthenic or chronic form of the disease, the strength must be supported by the most nourishing diet that can be given in small bulk, aided by tonics and wine if necessary; while doses of equal quantities of squill and digitalis (ten to fifteen drops of each) may be given twice or thrice daily. Turpentine is also a useful remedy. A combination of ergotine, iron and extract of belladonna with zinc in the form of pill, accompanied by sea-bathing, was of great service in this disease, as seen in Bahia.—WILLIAM AITKEN

BILIARY CALCULI—*See Gall-Bladder, Diseases of.*

BITES OF SNAKES, &c—*See Poison Wounds by Snakes, &c.*

BLACK DEATH—*See Plague.*

BLACK VOMIT—*See Yellow Fever*

BLADDER, Diseases of.—BLADDER, ATONY OF, arises from muscular weakness of old age, or after fevers, or paralysis, or from continued obstruction by enlarged prostate or organic stricture. It must not be confounded with actual paralysis. *Symptoms.*—Retention, or else incontinence of urine, caused by the overflow of the bladder. *Treatment,*—Catheterism twice a day; cold douche and frictions to lumbar spine, and injections of cold water. Electricity. Sometimes strychnine when a spinal affection seems to be the cause. *Prognosis.*—Depends upon curability of the cause and upon duration of the disease.

BLADDER, CANCER OF.—Epithelioma is very rare, and slow in its progress. Scirrhus is most rare, except as an extension from neighboring organs. Encephaloid is more common. *Symptoms.*—Frequent and difficult micturition; pain in neck of bladder, often extending to loins and hips as well as perineum; hæmorrhage usually sudden and copious; frequent and continuous oozings are more characteristic of villous growth (Thompson); enlargement of pelvic and lumbar glands; sometimes cancer cells are found in urine; growth may be felt per rectum or by catheter; cachexy. *Prognosis.*—Encephaloid cases last, on an average, twelve months; Brodie has known a duration of seven or eight years. *Treatment.*—Attend to general health, state of bowels, appetite, &c. Use anodynes, especially subcutaneous morphia injections, with no niggard hand; morphia suppositories; alcoholic stimulants. For the hæmorrhage, cold, rest, and injections, silver nitrate, gr. ss. to ℥ j., iron, and other local astringents. Recumbent posture in some cases. Some tumors in the female bladder are accessible for operation.

BLADDER, CATARRH OF.—Chronic inflammation with muco-purulent secretion. *Causes.*—Generally either stricture, calculus, or enlarged prostate; often paralysis; atony, ulceration, tumors, cancer; a sequel of acute cystitis; may arise from disease of neighboring parts, anus, rectum, vagina, and uterus; gout, gonorrhœa, foreign bodies, and, in fact, any irritant which can affect the bladder. *Symptoms.*—Frequent micturition; urine ammoniacal, fœtid, mixed with stringy mucus, deposits phosphates; the general health gradually gives way; pain, generally dull and radiating along perineum, anus, urethra, &c. *Pathology.*—The mucous membrane is thickened and congested, and the subjacent muscular tissue hypertrophied. *Prognosis.*—Recovery may take place in recent cases, but old cases generally die eventually worn out, or else in a typhoid state. *Treatment.*—1. Local: wash out bladder with warm water, or solution of acetate of lead (1-6 gr. to 1 oz.), argent. nitrat. (1-8 gr. to 1 oz.), nitric acid (m 1-2 to ℥ j); the strength may be gradually increased. P. P. White, of Dublin, uses 4 gr. borax to 8 oz. of "very hot water." When the urine is fœtid, carbolic acid (mj to ℥ iv). Manipulate very gently, and inject only 2 or 3 oz. at a time. Counter-irritation; croton oil or iodine to pubes; linseed and mustard poultices to pubes. 2. Internal remedies: Anodynes by mouth and rectum. Aperients. Buchu, uva ursi, pareira brava, triticum repens, iron. Dr. Gross strongly recommends copaiba and cubebs when the secretion is excessive. Demulcents: decoctions of marsh mallow, linseed, Irish moss, elm-bark, or barley. The urine should be made neutral if acid. Diet is very important: light, nutritious, farinaceous. Milk and fish. Rest horizontally; warm clothing; warm climates. In severe cases the lithotomy-incision has been made by Gross, Wheelhouse, Teevan, and others.

BLADDER, DILATATION OF, without hypertrophy, sometimes exists.

BLADDER, EXTROVERSION OF.—A congenital malformation in which the anterior wall of the bladder and the adjacent part of the abdominal wall are absent. More common in males than in females. *Symptoms.*—The red mucous membrane of the posterior wall of the bladder presents in the pubic region as a flattened tumor, on which the orifices of the ureters may be found; umbilicus absent; epispadias; urine always dribbling; consequent excoriations and urinous odor; impotence in the male. *Treatment.*—Zinc ointment for excoriations; urinals carefully fitted to the case. Radical cure by operations of Ayres, Wood, or Holmes. Skin-flaps are turned down from the neighboring parts—groins, scrotum, &c.—and united so that one surface of skin turns towards bladder, the other outwards. T. Smith's operation—Ureters into rectum.

BLADDER, FOREIGN BODIES IN.—*Treatment.*—Urethral forceps, lithotrite, operation as for median lithotomy.

BLADDER, HYPERTROPHY OF, arises from obstruction to the passage of urine, and from continued irritation. Commonly coexists with catarrh. Its existence can be inferred from that of its causes. Treat the catarrh and remove the causes.

BLADDER, ACUTE INFLAMMATION OF, usually affects trigone. *Causes.*—Predisposing are male sex, adult age, cold weather and season, intemperate habits, urinary obstruction. Common exciting causes are wounds, *e. g.*, lithotomy; calculi, intemperance, stricture, gonorrhœa, injury during parturition, protracted retention. Other causes are blows on perineum or hypogastrium, stimulant diuretics, *e. g.*, cantharides; blisters, catheterism, lithotrity. *Symptoms.*—Pain locally, affecting perineum, pubes, groins, sacrum, thighs, extreme irritability of bladder; urine voided spasmodically as soon as it enters bladder. In severe cases, such as those which may follow lithotomy, there are rigors, often delirium, extreme local tenderness, and great danger. In milder cases, such as often result from gonorrhœa, the symptoms are chiefly local. Urine deposits mucus and pus; in severe cases it is bloody. *Pathology.*—Usually commences at, and is often confined to neck of bladder; mainly affects mucous membrane; this is thickened and congested; in protracted cases, it gets dark in color. Occasionally lymph is exuded so as to form false membrane. *Prognosis.*—The mild form yields to treatment. The virulent form, especially in shattered constitutions, is often fatal, death being sometimes preceded by gangrene. *Treatment.*—Cathartics: castor oil, black draught, or calomel; diaphoretics; demulcent drinks flavored with a little lemon juice; all drinks to be tepid; opiate suppositories and enemata; colchicum in gouty cases. Hot baths; linseed and mustard poultices to the abdomen and perineum; fomentations; leeches (five, ten, or more) to the perineum and margin of anus. Cupping the loins when there is pain in that region. Retention should be watched for and may require catheterism. Painting hypogastrium and perineum with Tr. iodi.

Bladder, Inversion of.—Four cases have been recorded. Occurs in female children only.

Bladder, Irritability of the, always a symptom only, though its importance has given it the rank of a disease.—*Causes.*—1, disease of the urinary apparatus: vesical catarrh, stricture, prostatic disease, foreign body, tumor or calculus in bladder, disease of kidney or ureter, gonorrhœa; 2, state of urine, most common in elderly males; 3, diuretics, cantharides; 4, venereal excesses, onanism, a long and narrow prepuce; 5, indigestion, ascarides, hæmorrhoids, fistulæ, prolapsus ani, pruritus ani; 6, nervous disorders, hysteria, depressing emotions, excessive mental exertion; 7, debility from many causes; 8, exposure to cold; 9, ovarian and uterine diseases. *Symptoms.*—Frequent micturition, but the total amount of urine passed not excessive. *Prognosis.*—Good, when the cause can be removed. The disease is intractable in weak, scrofulous subjects. *Treatment.*—Remove the cause if possible; anyway, treat the cause. Ext. belladonna, gr. one-sixth per diem; copaiba; tinct. cantharidis; buchu; pareira brava. Farinaceous diet.

Bladder, Neuralgia of.—Very rare. Sometimes reflex, and depending on conditions of the liver, kidney, nerve-centres, &c.

Bladder, Paralysis of.—A name applied to loss of power of the bladder from nervous affections. Weakness from injury or disease of its muscular walls is called atony (which see). *Causes.*—Injuries or diseases of the spinal cord and brain; reflex paralysis from operations, especially those for hæmorrhoids; shock; debilitating diseases, especially continued fevers; sexual excesses, especially in old men; mechanical injury, *e. g.*, in protracted parturition; over-distention; severe inflammation; hysteria. *Symptoms.*—Firstly retention, and then incontinence also. Paraplegia often present. The distended bladder forms an abdominal tumor, *Prognosis.*—Depends chiefly on cause. Sometimes fatal, even when promptly relieved. *Treatment.*—Pass a full-sized catheter; only partially empty bladder at first if the distention be great; regular catheterism twice a day; cathartics; tonics; strychnine; cantharides; iron; quinine; arsenic. Electricity. Counter-irritation: cold douche. If possible, avoid catheterism in hysterical cases; try ordinary remedies for hysteria.

Bladder, Puncture of.—1, Supra-pubic: incise skin for half an inch in middle line, just above pubes; then plunge in curved trocar downwards and backwards; leave a soft catheter in the wound. 2. Per rectum. Guide a curved trocar on the left index finger in the rectum till the point can be placed against the bladder, in the middle line, just behind the prostate. During this first step, keep the trocar quite sheathed; then project the point, and plunge the instrument into the bladder; leave in a soft catheter.

Bladder, Rupture of.—The bladder is generally full at the time, and the patient often intoxicated. The usual causes are the passage of a heavy wagon over the abdomen, a fall or blow on the hypogastrium, a wound, or extreme retention of urine. *Symptoms.*—Sudden and violent pain in the pelvis or hypogastrium; great desire to urinate, but no urine passes; the catheter readily enters the bladder, but draws off only a small quantity of urine, which may be bloody. Collapse, then peritonitis. *Prognosis.*—Almost always fatal, except where there is an open wound, with the peritoneum uninjured. *Treatment.*—Use a catheter open at the extreme tip, to keep the viscus empty; do not pass it far into the bladder; use the proper remedies for peritonitis, especially opium and warm applications, but avoid depletory measures. If you feel sure of your diagnosis, it is justifiable to open the abdomen antiseptically, wash it out. and sew up a rent in the bladder.

Bladder, Stammering of, or, rather, of urinary organs.—A condition in which, without any more visible organic disease than exists in stammering of the vocal organs, the sufferer cannot micturate freely at will. The stammering is usually aggravated by anything which directs the patient's attention to the act of micturition, or which makes him "nervous," or by temporary disorder of digestive or urinary organs. *Treatment.*—Strengthen general health, attend to digestion and state of urine. Teach patient to pass a catheter for himself, so that he may be free from fear of retention (Paget's *Clin. Lect.*)

BLADDER, TUBERCLE OF, seldom if ever, occurs except with tubercle of other urinary organs. *Symptoms.*—Those of ulceration in a tuberculous patient. *Treatment.*—That of tuberculosis: anodynes; rest.

BLADDER, TUMORS ON, are 1, fibrous; 2, villous; or 3, cancerous and not villous. The first may cause no symptoms, or, if unfortunately situated, those of obstruction or irritation. The second causes constant hæmorrhage, which is generally at last fatally exhausting. For the third see CANCER OF THE BLADDER. The catheter may be gently used where there is obstruction; mild astringents and rest for hæmorrhage; strength to be supported by chalybeates, good diet, &c. In women, vesical tumors may sometimes be felt and removed through the urethra. The villous growth is sometimes the cause of severe pain and may or may not be cancerous.*

BLADDER, WASHING OUT, may be done either with a double-current catheter or with Clover's apparatus, with Bigelow's apparatus or with a syphon tube.—C. B. KEETLEY.

BLEEDING.—Venesection. Veins used: median-cephalic, median-basilic, external jugular, saphena veins near ankle, veins of scrotum. Instruments required: bleeding-tape or bandage, bowl, lancet, pad, sponge, and water. Apply tape to middle of upper arm, tight enough to congest veins, but not to affect pulse. Hang arm down a little while; then choose spot and apply thumb just below it. Pass lancet gently and obliquely into vein, and enlarge opening without deepening incision; draw off enough blood. If necessary, make patient work his hand, opening and shutting it. Finally, apply pad over wound; fix it with the tape; put arm in sling for two days. In opening external jugular, put the pad just above the clavicle, and cut in the direction of the fibres of the sterno-mastoid. Bathe the veins of the scrotum with warm water before and after opening them. Arteriotomy.—Cut the temporal artery, or its anterior branch half in two traversely; when enough blood has flowed, divide it completely, and apply a pad and bandage.—C. B. KEETLEY.

BLENNORRHŒA (Gleet)—*See Gonorrhœa.*

BLEPHARITIS—*See Eyelids, Diseases of.*

BLOOD, Transfusion of—*See Transfusion of Blood.*

BLUE DISEASE—*See Cyanosis.*

BOILS.—*Causes.*—Debility or plethora (but these causes are probably never sufficient when uncomplicated); change of diet; excessive perspiration; hydropathy; sea-bathing; air of dissecting-rooms; training; spring and early summer season; diabetes; diseased meat; irritation of sexual organs; local irritants of various kinds, *e. g.*, edge of a frayed shirt collar; poultices. *Symptoms.*—The local appearances are well known. There is rarely any fever. Sometimes premonitory symptoms, such as feeling of chilliness, bad temper, etc. *Pathology.*—In the first instance, a boil is frequently indistinguishable from an acne-spot. Indeed, in a person suffering from an attack of boils, almost any acne-pimple can be irritated into a boil by persistent friction, or by exposure to some continuous irritant, such as the sea-water constantly wetting the wrists of fishermen. A boil is a local cellulitis, often spreading from an inflamed sebaceous follicle; and the reason of this spreading is, in most cases, not the specific nature of the original cause, but persistent local irritation. As it is quite as easy to protect from local irritation, and to check acne, as to cure the specific cause of boils, if there be one, I hold that this view of boils is of practical importance. The "core" of a boil is a central slough of cellular tissue. *Treatment*—Local.—Soap plaister. Poultices or water-dressings should be avoided, as they bring out fresh boils. Incision (complete) of very painful ones. Ext. belladonnæ and glycerine on lint. Blind boils may be aborted by the application of a strong caustic to the commencing vesicle; strong carbolic acid locally (Eade of Norwich). *General Treatment.*—Regulate the diet. When any poison appears to have been absorbed, use eliminative treatment, *e. g.*, purgatives, Turkish bath; moderate exercise; light clothing; arsenic; yeast, one tablespoonful three times a day. See Smith's article in Holmes' *System*, vol. v. Bathe part where the boils chiefly appear with water as hot as it can be endured, and, above all, remove every cause of local friction or chafing.—C. B. KEETLEY.

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*Papilloma of Bladder is always attached to trigone between the two ureters. (Rindfleisch).

BOIL, Delhi—*See Delhi Boil.*

BONES, Diseases of, resemble those of the soft tissues, but are remarkable for the extreme slowness with which the pathological changes usually take place.

NOTE.—The pathology of the varieties of inflammation in bone and periosteum will be given collectively, for the sake of convenience and clearness.

BONE, ATROPHY OF.—*Causes.*—Injury *e.g.*, fracture; chronic inflammation; disuse, *e.g.*, in the case of the bone of a stump; old age, *e.g.*, atrophy of the lower jaw; pressure, *e.g.*, that of a tumor. *Pathology.*—The bone becomes not only smaller, but its cancellous and medullary spaces enlarge; a certain amount of fatty degeneration is frequent.

Pathology of Osteal and Periosteal Inflammations.—Pathology of Acute Periostitis.—Attacks chiefly the bones, especially the femur; medulla may be coincidently inflamed; in a typical case, in which both periosteum and medulla are affected, the vessels of each are highly injected, and the intervascular tissue infiltrated with young corpuscles; this stage may end in complete resolution, in ossification of some of the inflammatory new formation; or, as in most cases unfortunately, it may end in suppuration; then the skin reddens, the œdema becomes marked, and neighboring joints swell; the suppuration separates the periosteum, not usually from the whole shaft, but frequently from half of it, though also only on part of the circumference; except in rare instances in small children necrosis is now inevitable.—*See* Necrosis of Bone.

Pathology of Chronic Periostitis.—It is often accompanied by superficial inflammation of the bone itself. The two layers of the periosteum (internal, fibrous, and external, cellulo-vascular) cannot be separated from each other, but are swollen, infiltrated with young cells, and traversed by dilated capillaries; they are easily separated from the adjacent bone, whose surface is generally covered with small nodules of new bone; the general opinion is that these nodules (osteophytes) grow from the periosteum; periostitis, with the formation of these osteophytes and without suppuration, is usually syphilitic. When suppuration occurs it may be without any destruction of bone, caries or necrosis; but usually the bone is rough and gnawed, often to a considerable extent; this occurs especially in strumous periostitis. Then again, in other cases of chronic periostitis, a soft, fluctuating swelling forms, consisting, not of pus, but of granulations springing from carious bone; these cases are often also strumous.

Pathology of Caries.—Chronic inflammation causes the corpuscular and vascular elements of the soft parts of bone to increase at the expense of the earthy parts; the young cells seem, as it were, to corrode the walls of the lacunæ, etc., in which they lie; these corrosions, spreading and uniting, may cause destruction to an indefinite extent; the bone thus corroded is dissolved, and is either absorbed or flows away in the discharges. Around the region of the caries is sometimes a zone of sclerosis, *i.e.*, of bone in which the inflammatory new material has ossified between the trabeculæ of the original bone. The distinctive characters of strumous caries are thus given by Walsham (Surgical Pathology, p. 16): "It is characterized by the tendency of the inflammatory products to undergo caseous degeneration, by the extensive destruction of the affected part, by the softened, fatty, and oily condition of the bone around, by little tendency to the formation of new bone, and by the feeble efforts towards repair."

Pathology of Necrosis.—The dead bone is bloodless, and either white, or else darkened by the action of the air, pus, or blood; on the surface lately continuous with living bone it is rough and corroded; but on the free surface, usually smooth. The process of separation of necrosed bone is as follows: granulations form at the plane of contact of living and dead bone, and these granulations dissolve the earthy medium still uniting the dead to the living bone, thus setting the former free; the soft tissues in contact with dead bone loosen from it everywhere, and often a layer of pus intervenes; then the dead bone lies in an abscess cavity. When part or whole of the shaft of a long bone necroses, these same neighboring soft parts, most especially the periosteum, proceed as a rule, to build a shell of new bone, within which the necrosed bone lies; this shell is perforated in one or more places by cloacæ (passages for the egress of discharge); the piece of necrosed bone is called the sequestrum; it takes months to separate from the living bone; it is eventually either discharged or absorbed, or removed by operation, or it may remain even for years. So long as it remains, the new bone around it usually grows thicker; when it is removed, the remaining cavity fills with granulations, which ossify; gradually the new bone, by a process of external absorption and internal growth, gets to resemble more and more the shape and consistence of the original bone, whose place it is to take. Practically speaking, only the smallest sequestra can be absorbed. In necrosis of flat, and of short spongy bones, there is small prospect of thorough reproduction; in these cases, necrosis is usually combined with caries, and often with a chronic constitutional disorder. Necrosis when confined to the surface of a bone, is called "superficial," and when to the interior of a bone, "central;" in the former the sequestrum is called an "exfoliation;" central necrosis constitutes almost an independent disease.

Pathology of Central Necrosis—Is the result of inflammation of the deeper parts of the bone, and is usually accompanied by caries; it leads to a bone abscess, to a simultaneous periostitis on the neighboring external surface of the bone, and to a consequent thickening of the bone. Note, though central necrosis is pretty sure to lead to abscess, yet abscess of bone does not usually imply necrosis.

Chronic Abscess of Bone.—First described by Brodie. Most usual seat, head of tibia. *Causes.*—Obscure, sometimes injury. *Symptoms.*—Those of ostitis and periostitis confined to a circumscribed locality. An abscess is suspected because of the persistence of the symptoms, and because of the localized and circumscribed tenderness. *Diagnosis and Treatment* require the same proceeding, viz., trephining at the tenderest spot. *Generally the abscess is here very superficial.* The trephine has in some cases just missed the cavity. Holmes advises in such cases to perforate the walls of the trephine hole in several directions in search of the pus. *Prognosis* is excellent when the trephine pierces the abscess; otherwise there is danger of abscess opening into neighboring joint.

INFLAMMATION OF BONE.—Three chief varieties, according to part mainly attacked, viz., ostitis, periostitis, and osteo-myelitis.

Ostitis.—Inflammation may begin in the bone proper without affecting the periosteum or medulla at first. *Causes.*—Though it is often excited by an injury, there is usually some predisposing cause—syphilis, struma, or simple constitutional debility. *Symptoms.*—Deap-seated aching pain, worse at night, and other symptoms, all like those of periostitis. *Results.*—It usually ends in caries or sclerosis, *quod vide*. *Treatment.*—Counter-irritants, *e. g.*, iodine; or warmth and moisture locally, or cold applications. Treat cause: iodide of potassium. Linear osteotomy in bad cases—Erichsen. Linear osteotomy is the longitudinal division of the part of the bone affected, down to the medullary canal, by a Hey's saw. Mild counter-irritants, rest, an elevated position, perhaps gentle compression and weak purgatives, are the best abortive treatment when the disease is commencing.

Periostitis, Chronic or Sub-Acute.—*Causes.*—Syphilis, rheumatism, injuries; may be secondary to ostitis, or spread from an inflamed articulation. *Symptoms.*—Swelling, aching pain, worse at night; heat: skin usually not reddened; swelling mostly in the form of a node. *Prognosis.*—Usually ends in resolution, often causes thickening of the bone, growth of osteophytes; rarely ends in suppuration. *Treatment.*—*See* Ostitis.—Also an incision, subcutaneous or otherwise, to relieve a bad case.

Periostitis, Diffuse.—*Causes.*—Age, usually about puberty; sex, mostly in boys: generally follows injury; strumous. The effusion strips the periosteum from the bone and almost always causes necrosis, sometimes of an entire shaft of a long bone. *Symptoms.*—Femur or tibia usually affected; swelling, heat and pain, easily confounded with cellulitis or acute rheumatism, but it does not spread over the joints above and below the bone; both local and constitutional symptoms very severe; suppuration; then rigors, glistening skin, fluctuation, &c. For future course, &c., *see* Necrosis. *Prognosis.*—Highly dangerous; death may occur before suppuration, or may result from exhaustion or pyæmia afterwards. *Diagnosis.*—From acute rheumatism or cellulitis; care only required; no rheumatic affection of heart, or any separate joint; fever different, &c. *Treatment.*—Rest, elevated position; local applications, warm fomentations; free incision when abscess has fairly formed; incisions to remove tension at an earlier period usual. Such early incisions predispose to pyæmia—Billroth. Such incisions can be made antiseptically.—*Vide* also Necrosis.

3. *Osteo-Myelitis*, or inflammation of the medulla of a bone, is extremely rare, except as the result of direct injury *e. g.*, from compound fracture or after amputation through a bone. Inflammation of a bone may be judged to begin in the medulla if the swelling does not appear till some days after the severe local pain; there is always violent fever; the periosteum separates from the diseased bone without being pushed off by suppuration; the prognosis and treatment resemble those of diffuse periostitis, only the former disease is even more serious; authorities are divided as to whether a limb known to be affected with acute osteo-myelitis, should be amputated or not; a limited osteo-myelitis, after amputation and leading to a slight necrosis, is frequent, and not necessarily serious.

NECROSIS.—*Causes.*—The same as those of periostitis, ostitis and osteomyelitis. Necrosis of the jaw occurs, less frequently now than formerly, among workers in phosphorus; and it is said that the phosphorus fumes attack only those with unsound teeth. For immediate causes see the section on Pathology of Bone Diseases (supra). *Symptoms and Diagnosis.*—Necrosis may be fairly presumed to have occurred when (1) inflammation of a long bone or its periosteum has been acute or prolonged, while (2); extensive hard thickening has taken place, indicating the formation of a new bone and (3) the pus from any sinus existing is thick and yellow. In caries, on the other hand, the spongy bones are the usual seat, the formation of a new bone is usually slight, the pus thin and serous; but the probe is required to settle the diagnosis. If gently used it causes little or no pain in necrosis, usually much pain in caries; the sequestrum in necrosis feels smooth and hard; carious bone is rotten; but it is to be remembered that the probe may fail to reach the sequestrum, and that in a few cases enormous thickening exists with caries only. The probe should be pressed firmly against the sequestrum to feel if it is movable and ready for "sequestrotomy." Necrosis is sometimes found to have occurred without any history of precedent inflammation, This is called "Quiet Necrosis." Vide Paget's Clin. Lect. and Morrant Baker, in "S. Bart. Hosp. Reports," vol. 13. Prognosis depends on the acuteness of the inflammation, and on the extent of bone involved. Acute necrosis of the whole shaft of a long bone is excessively dangerous. Pyæmia sometimes follows the opening of the abscess. *Treatment.*—Treat the cause, e. g., struma; before suppuration, try to cause resolution by counter-irritants, cold, &c.; when abscess has fairly formed, open it; some recommend incisions before then, merely to relieve the tension of the periosteum; Billroth condemns this plan, saying that it predisposes to pyæmia. When necrosis has actually taken place, you must wait till the sequestrum has loosened and then remove it, treating the general health in the mean time. Unless the sequestrum can be felt loose, a very considerable time, even many months, had better be allowed before attempting to remove it by operation. *Operation for Necrosis.*—Tourniquet, or (much better) Esmarch's bandage; sponges, &c., scalpel, Hey's saw, cutting pliers, necrosis forceps, gouges, chisels, hammer, probe, oiled lint, bandages, and minor instruments. Incise the soft parts; it is often advisable to unite two sinuses by the incision. Cut a sufficient, but no larger, opening in the sheath of new bone; divide the sequestrum if it cannot easily be removed whole; plug the cavity with oiled lint. When the whole shaft of a long bone has necrosed, it had better be removed as soon as the acute symptoms have passed away, unless the epiphysial cartilages have been involved in the inflammation It may be desirable to divide it in the middle by a chain saw. A new shaft may be expected to form, unless the epiphysial cartilages have been destroyed; in this case a new shaft can only be expected when the sequestrum is left for a long time *in situ*. If the necrosis be extensive, and for some reasons cannot be removed, while the patient's health is giving way, amputation must be done.

Hypertrophy of bone is commonly the result of inflammation, which may or not be specific. The cause should be treated. The disease may follow a blow.

Bone, Injuries of.—Blows are liable to cause atrophy in the old, and strumous disease in the young and weakly; they are sometimes followed by hypertrophy. See Fractures, &c.

Mollities Ossium.—A disease allied to fatty degeneration of bone. *Causes.*—Mostly attacks females; age, middle life or later; pregnancy. *Symptoms.*—At first rheumatic pains, then various bones soften and bend, and afterwards fracture. The general health is only injured by the physical effects of the resulting fractures and deformities. The chest and spine being deformed, the thoracic and abdominal viscera may be compressed, and a distorted pelvis impedes delivery. Large quantities of phosphates in the urine. *Diagnosis.*—From rheumatism, syphilis, and cancer; a bone fractured through the weakening effect of cancerous deposit gives way suddenly without bending previously. *Prognosis.*—Almost always fatal sooner or later, through weakening the power of the constitution to resist intercurrent disorders; rarely fatal through its own cachexia; cases of recovery are excessively rare. *Treatment.*—Tonics, cod-liver oil, phosphates, attention to digestive functions; special gymnastics for the deformities.

Osteitis Deformans.—A very rare disease, lately described by Sir James Paget in the Medico-Surgical Society's Transactions. *Chief Characteristics.*—General enlargement of the bones, with sufficient softening to permit slight loss of height (several inches) through arching of the long bones of the lower extremities and bending forward of the head on the breast; ribs also thick and immovable; skull thickened; cranial sutures obliterated; compact substance greatly increased. According to Butlin, the microscopic changes indicate that the disease is an inflammation rather than a new growth. In this view Paget concurs, hence the name "osteitis." But the frequent coincidence of sarcoma or carcinoma with this affection is most remarkable. Little or no pain usually, only clumsiness. Disease lasts for years, and death has often occurred from the intercurrence of the above-mentioned malignant tumors. The usual remedies for other forms of osteitis appear to be of no avail. The large doses of pot. iod. and of arsenic, which have given Esmarch and Billroth encouraging results in the treatment of new growths, have not to my knowledge, been tried in this very rare disease.

Osteo-Aneurism, or Pulsating Tumor of Bone.—Almost always malignant; usually occurs in cancellous ends of long bones, in skull, and pelvis. *Symptoms.*—A tumor, "oval, uniform, and elastic to the touch, growing slowly;" pulsation and a bruit (the latter sometimes, but rarely, absent.) Tumor may be partially emptied by pressure, and then the bony margin of the cavity in which it lies may be felt. Crackling shell of bone sometimes felt over it. *Diagnosis.*—1. The diagnosis of innocent from malignant pulsating tumor: in the latter case there may be evidence of malignant disease elsewhere; the tumors may be multiple; the growth is probably more rapid and the tumor more painful. 2. From ordinary aneurism: by considering the situation and the characters mentioned above. *Prognosis.*—Depends upon whether tumor is malignant or not. *Treatment.*—For innocent cases, try pressure on, or ligature of main artery; Esmarch's bandage might be tried: innocent tumors have also been gouged out. All other cases require amputation.

Sanguineous Tumor of Bone.—*Vide* Cystic Tumors.

Scrofulous Disease of Bone.—*Vide* Scrofula. Often follows injury. *Symptoms.*—Swelling, usually of an indolent and chronic character; superjacent skin commonly pale, hence the term "white swelling." Other symptoms of scrofula: in a large proportion of cases some internal organ is the seat of tuberculous or cheesy deposit. As the disease advances, there are symptoms of caries and abscess, the latter often appearing far away from the diseased bone. Most of the sufferers are children. The mischief often spreads to neighboring joints, and the suppuration tends to spread far and wide along intermuscular spaces, etc., before the abscess bursts. *Diagnosis* rests on the local symptoms above given, and on the presence or absence of other signs of the scrofulous diathesis. *Prognosis*—Local recovery may usually be expected (in about two years according to Stanley) if the general health holds out, but relapse is very common both in the original seat of the disease and elsewhere. *Treatment.*—General treatment of scrofula. Locally: complete rest; counter-irritation by painting with iodine, etc., till abscess fairly forms, and even afterwards (Furneaux Jordan). There are special apparatus to give rest to special parts of the body; *e. g.*, for Morbus Coxæ and for Pott's curvature, *quod vide*. Remove the diseased bone by operation in suitable cases.

SYPHILITIC DISEASE OF BONE.—Usually, if not always, begins in the adjacent soft parts. *Symptoms.*—The first are usually pains like those of rheumatism, and worse at night. They are called "osteoscopic." Then nodes are found. They are circumscribed, round, or oval swellings, occurring chiefly on such bones as are subcutaneous, but sometimes elsewhere, *e. g.*, upon the inner surface of the skull. The primary affection is in the periosteum. Small tendency to suppuration. Production of new bone. Caries and necrosis caused by more acute syphilitic periostitis. Three forms of syphilitic ulceration of bone, viz: the annular, the tuberculated, and the reticulated. Dry caries (caries sicca) is frequently syphilitic. Syphilis, by destroying the bones, causes peculiar deformities in some parts, *e. g.*, flat nose, destruction of palate, etc. Syphilitic ozæna. Epilepsy from pressure of intra-cranial nodes. *Diagnosis.*—Ulcerations have characteristic syphilitic shape, appearance, and history. Syphilitic nodes are known by their position, hardness, indolence, and liability to nocturnal pains. *Prognosis.*—Good, except in tertiary syphilitic ulceration; bad cases of this are sometimes quite incurable. *Treatment*—*Vide* Syphilis.

BONE, MALIGNANT DISEASE OF.—True carcinoma of bone is said to be always secondary, never primary. Most so-called "cancers of bone" are sarcomata. For full details as to structure of "osteoid cancers," see Walsham in "S. Bart's Rep.," vol. xv., and for full details as to clinical history of malignant tumors of bone, see Butlin's lecture in *Brit. Med. Journal* for July, 1880. Sarcomata of bone commence either centrally or subperiosteally. The latter are far more likely to recur and to infect the system than the former. The lower end of femur and upper end of tibia are the most common seats of central sarcoma. The lungs are the usual seats of secondary infection. Both central and periosteal tumors of bone frequently become ossified (osteo-sarcoma, osteo-chondroma, etc.) However much the shaft of the bone may be affected, the articular cartilage remains healthy. Some tumors are perfectly encapsuled, others infiltrate every neighboring structure. The bone may give way at the seat of disease, a fracture thus resulting. When carcinoma of a bone does occur, it is usually encephaloid. *Diagnosis.*—*Vide* Cancer. Enchondroma and even cancellous exostoses sometimes resemble malignant tumors in their rapid growth. But they may be recognized by their hardness. *Prognosis.*—As above mentioned, central sarcoma is less likely to recur than periosteal sarcoma. Frequently no recurrence takes place after thorough removal, and these tumors occasionally reach a large size before infecting the system. *Treatment.*—Excise, except when disease has infiltrated regions which cannot be removed, *e. g.*, certain parts of the skull. Unless the tumor is evidently circumscribed, remove the whole bone. This generally necessitates amputation at the joint above. But in cases of disease of the lower end of the femur it is not usual to exarticulate at the hip, that operation being so dangerous. Still, when the cancer is soft and diffuse, even this risk should be run.

TUMORS OF BONE.—The innocent are enchondroma, exostosis, cystic, fibrous, fibro-cystic, and hydatids. Vide the various articles, Tumor, Exostosis, Entozoa, etc. The great majority of innocent tumors of bone are either exostoses or enchondromata.

ULCERATION OF BONE.—*Vide* Caries.

CARIES.—*Causes.*—Predisposing are scrofula, syphilis, and constitutional weakness, such as arises from old age. Exciting cause, often some injury. *Symptoms* are those of ostitis leading to the formation of an abscess. When this opens, a probe can often detect the softened bone. If the probe will not reach the disease, the occurrence of certain deformities, *e. g.*, Pott's curvature, may offer a sure sign. Scrofulous caries usually attacks the vertebræ, articular epiphyses, phalanges, and metacarpal bones. Syphilitic ulceration affects mostly the tibia, cranium, sternum, hard palate, and nasal bone. *Diagnosis.*—In the early stage the bone may not be recognized to be diseased at all, or may be supposed to be merely rheumatic. *Prognosis.*—Ulcers of bone often cicatrize: bad cases not very hopeful. The younger the patient, and the less important the bone, the better the prognosis. Danger of amyloid disease, and fatty degenerations of important organs supervening. *Treatment.*—Constitutional for the scrofula or syphilis, etc. Local.—Rest; elevation; the usual treatment of inflamed bone at first, then that of chronic abscess. If the patient's general health be tolerably good, and the locality of the disease suitable, the carious bone may be removed by gouge, gouge-forceps, chisel, or Marshall's osteotrite. Use of strong or slightly dilute nitric or sulphuric acids. When a bone is sufficiently diseased, resection (complete or partial) is sometimes justifiable, or amputation may be required occasionally to save life.—C. B. KEETLEY.

BOUTONNIERE OPERATION.—A term applied to a proceeding in which a "button-hole" is purposely made in some part. It is done through the soft palate, to facilitate the extraction of polypi, and into the urethra from the perineum, in order to expose the commencement of an impermeable stricture.

BRAIN, Abscess of—*See Brain, Inflammation of.*

BRAIN, Anæmia of.—Two *varieties.* In one the quantity of blood in the brain is diminished below the normal standard, in the other the quality of the blood is impoverished.

Causes.—The first variety is due to direct loss of blood, to deficient action of the heart, to impaired nutrition, or to some cause preventing the due access of blood to the brain. The second is due to disease of some organ concerned in hæmatosis or to a general cachexia., *e. g.*, hæmorrhage or other exhausting discharge, chronic dysentery and diarrhœa, malarial and other fevers, rheumatic, strumous, and cancerous diatheses, diseases of the bones and joints, congestion of internal organs, pressure upon or obliteration of the arteries supplying the brain, excessive mental exertion, the action of mental emotions, as fear, certain medicines, tartarized antimony, calomel, oxide of zinc, and the bromides, also tobacco, insufficient nutrition, shock from physical injury, and the passage of a galvanic current of too great intensity through the brain.

Symptoms.—Syncope, vertigo, paleness of the features, coldness of the extremities, weak, frequent, thread-like pulse, feeble and accelerated respiration, headache confined to a limited portion of the head, a feeling of constriction across the brows, ringing in the ears, largely dilated pupils responding slowly to strong light, pain on using the eyes, cold and clammy skin, nausea and vomiting and convulsions of an epileptic character may occur, feebleness of muscular power, possibly general or partial paralysis with derangements of sensibility such as coldness, formication, and "pins and needles," hallucinations and illusions, drowsiness in the sitting posture dispelled by recumbency, systolic and diastolic bellows murmur at the base of the heart; there may be arterial and venous murmurs, tendency to melancholy, and possibly insanity.

Prognosis.—In the gradually developed form the prognosis is favorable; in those cases which are the result of sudden and profuse loss of blood, especially if the patient is pulseless and convulsions have occurred, the prognosis is very grave.

Treatment.—Get rid of the cause. If it is hæmorrhage arrest it; if there is exhausting discharge from the air passages, the intestines, or the genital organs, stop it; if the digestive or assimilative organs do not perfectly perform their offices they must be put in good condition; if a tumor or other obstruction to the due course of the blood to the brain exist, it must be removed; if the hygienic surroundings or food be bad they must be improved. No medicine is so beneficial as alcohol, preferably whiskey, brandy or rum. This should be given in quantity large enough to appreciably increase the heart's force. If for any special reason alcohol cannot be given, give carbonate of ammonia, or aromatic spirits of ammonia, or in extreme cases ether and even transfusion may be necessary to save life. A few drops of nitrite of amyl poured on a handkerchief and held to the mouth for inhalation may relieve. In chronic cases nitrite of amyl should be inhaled in doses of four to eight drops three times a day. Opium in one-quarter grain doses three or four times a day and continued for several weeks. Galvanism is useful if the tension be low; not more than two or three cells should be brought into action, and the current should be passed only for a few seconds at a time. As adjuncts to these means the bitter tonics are useful—quinine, gentian, columbo, and quassia. Cod-liver oil, nutritious diet, and the recumbent position. Moderate mental exercise and the avoidance of physical exercise and emotional disturbance are all valuable agents in the treatment of cerebral anæmia.—WILLIAM A. HAMMOND.

See also Ischæmia.

BRAIN, Atrophy of.—*Natural History.*—Diminution of brain substance, without induration or softening. The disease is usually congenital, or the consequence of some severe hydrocephalic disease, or of old age, or of long-standing exhausting disease, especially in children, serum being effused in the space between the brain and its coverings, in order to supply the deficiency in bulk. Sometimes also one side may be more atrophied than another; the membranes appearing to be greatly shrivelled after the fluids escape; the convolutions are thin, and the sulci wide. The sufferers are generally idiotic, and possess but little use of their limbs.

True atrophy of the brain consists in a diminution of the size or number of the brain elements, without a previous destruction of them, or shrinking of cicatricial-like tissue. Two forms are to be distinguished—(1.) Incomplete development, or congenital deficiency. (2.) Retrogression, or disappearance of brain elements. In the first form the development may be so incomplete that either there is perfect idiocy or life cannot be maintained. There occurs also during fœtal life and the first year of childhood, an arrest of growth on one side—the opposite side continuing to grow. Such cases may live and attain a certain degree of mental development. After the development of the brain is complete, atrophy may set in primarily as senile marasmus, or it may be a result of exhausting and wasting diseases. Local disease in the brain is also a cause of secondary atrophy, such as the lesions of apoplexy, softening, or encephalitis.

Weakness of intellect or decided idiocy are the usual accompaniments of atrophy. The organs of special sense, especially the eye, are very obtuse, and the peripheral nerves over the paralyzed half of the body are diminished. Paralysis and atrophy of the body on the side opposite the atrophied hemisphere are usual symptoms of the lesion. Paralysis is generally complete and combined with contractions of tendons. The bones are atrophied as well as other parts. Epilepsy is usual, and although the disease is not of itself fatal, intercurrent lesions usually very readily cause death.—WILLIAM AITKEN.

BRAIN, Compression of,
BRAIN, Concussion of, } *See Head, Injuries of.*

BRAIN, Congestion of.—Two *varieties*, Active and Passive.

Causes.—Of the active, influences inducing activity of circulation; of the passive, those inducing torpidity of circulation, *e.g.*, intellectual exertion, mental anxiety, emotional disturbance, temperature, sudden and violent physical exertion, rapid and over-eating, certain foods and medicines; sex, age, hypertrophy of left ventricle, dilatation of right ventricle.

Symptoms.—Wakefulness, illusions, delusions, hallucinations, morbid apprehension of impending evil, emotional disturbance, mental introspection, vertigo, pain, heat and feeling of fulness in head, headache, noises in the ears, disturbances of vision, smell and taste, sensory and motor disturbances, capricious appetite, irregular bowels, scanty and high colored or profuse and pale urine, apoplectic, maniacal, soporific, convulsive and aphasic attacks.

Prognosis.—Favorable under appropriate treatment, majority recover in ten days.

Treatment.—Active form local bleeding, cups to the nape of the neck, leeches just inside the nostrils, actual cautery to nape of the neck, cold water or ice to the cranium or nape of the neck, keep head elevated during sleep, forbid severe muscular exertion, clothing loose about the neck, mustard plaster to epigastrium, warm water to the feet, the constant galvanic current one pole over the sympathetic nerve in its course through the neck, the other on the back of the neck as low down as the seventh cervical vertebra, the current from about fifteen Smee's cells is sufficient and should not be allowed to act for more than two minutes; if extreme vertigo is produced lessen the number of cells. Internal remedies with or without the external measures mentioned are generally effectual in relieving the patient. The following are useful formulæ: ℞. Bromide of potassium, ℥ j.; water ℥ iv.; of this a teaspoonful is to be taken in a little water three times a day, occasionally the bromide is increased to ℥ iss., and sometimes a saturated solution grs. xxx to ʒ j. is used. Continue the medicine till drowsiness, a slight feeling of weakness in the legs, and contraction of the blood-vessels of the retina, detected by the ophthalmoscope, are produced. An excellent formula is sodii bromide. ℥ j.; ergotæ ext. fl. ℥ iv. m. fl. sol. Dose, a teaspoonful three times a day. The oxide of zinc in gr. ii. doses should be given either in form of pill or powder after meals. At the end of ten days all symptoms of congestion will probably have disappeared leaving a little debility and mental depression; tonics and restoratives should then be given as the following: Strychniæ sulph. gr. j.; ferri pyrophosphatis, quinine sulph. aa ʒ j.; acid phosp. dil., zingiberis syrupi. aa ℥ ii.; m. ft. mist. Dose a teaspoonful three times a day in a little water, or ℞. Zinci phosphidi grs. iij.; rosat. conserv., q. s. M. ft. in pil. No. xxx. Dose, one three times a day; instead of the conserve of roses grs. x. of the extract of nux vomica may be substituted if strychnia is not being administered in some other form. In the majority of cases there are dyspeptic symptoms, in these cases pepsin and powdered charcoal should be given with each meal. If the bowels are constipated an enema of warm water or olive oil may be given, if the urine is scanty and high colored saline diuretics are useful. In the passive form of the disease any influence interfering with the due return of blood from the head should be counteracted at once. Stimulants as alcohol, or carbonate of ammonia may be given from the first in conjunction with bromide of potassium with ergot. Sulphuric ether inhaled from a handkerchief to the extent of a teaspoonful several times a day may afford relief. In both types of the disease hygienic treatment should be persistently carried out. Food should be nutritious, digestible, ample; alcohol and tobacco restricted to moderate limits, tea and coffee left to patient's inclinations. Exercising in the open air, daily bathing and subsequent friction with a tape towel and the Turkish bath cannot be too highly commended. The cause of cerebral congestion, whatever it be, must, if practicable, be removed and it must continue removed.—WILLIAM A. HAMMOND.

BRAIN, Hypertrophy of.—Only a few remarks are required with reference to the so-called hypertrophy of the brain in children. This is associated either with rickets or with congenital syphilis; and the increase in size and weight of the organ is probably due either to albuminoid infiltration of the white substance or to increase in the neuroglia. The tissue becomes unusually firm, pale, and dry; the convolutions being compressed, flattened, and closely packed. The head expands, but the enlargement is distinguished from that of chronic hydrocephalus by being much less rapid in its progress, never attaining any great size, and by having an elongated form from before back; while the fontanels and sutures are not at all or but little apart, the former being often depressed, and not yielding fluctuation; and the eyes are sunken. Frequently there are no evident nervous symptoms, but if the head is closed before the brain enlarges, serious symptoms are liable to arise, such as severe headache, vertigo, mental failure, epileptiform attacks, paralysis, or coma.—FREDERICK T. ROBERTS.

BRAIN, Inflammation of.—*Two varieties*—That occurring with meningitis and that occurring as an independent lesion. The former has been considered with meningitis; the latter will be mainly discussed in reference to the subsequent formation of abscess.

Causes.—Age and sex are predisposing causes. It is more frequent in males and in old persons. Among the exciting causes are the inordinate use of alcoholic liquors, venereal excesses, extreme intellectual exertion, great emotional disturbance, and exposure to extreme heat. It may also be induced by disease of the internal ear, by erysipelas affecting the head, or by severe attacks of scarlet fever, small-pox, or other eruptive disease.

Symptoms.—The premonitory symptoms are vertigo, pain in the head, noises in the ears, troubles of vision, numbness, and difficulties of speech. Sometimes the first observed symptom of approaching encephalitis is an epileptiform convulsion. When the disease is established the symptoms are, in general, disorders of sensibility, of motility, of intelligence, and of the functions of organic life. There is hyperæsthesia succeeded by anæsthesia, headache, pains in various parts of the body, formication, numbness and other abnormal sensations of the kind, mainly affecting the face and upper extremities. There are flashes of light, and photophobia, increased irritability of the retina, contraction of the pupils, with subsequent dilatation and loss of vision. Hearing is at first acute, and slight noises are painful, but is subsequently impaired and eventually lost. Taste and smell are rarely affected.

The motor organs first exhibit evidence of increased excitability from twitchings of the muscles to general convulsions, with or without loss of consciousness. This period corresponds with that of augmented sensibility. It is succeeded by a period of diminished motor power. Paralysis begins generally in a distant part of the body, and slowly involves one side. Ptosis is common, and external strabismus, causing double vision, accompanies it. The first sign of diminished motility is the frequency with which the tongue is bitten.

The first indication of mental weakness is abnormal susceptibility to the influence of emotions. The patient will get uncontrollable fits of laughing or crying. There is enfeeblement of the memory, which gradually develops into a condition of complete dementia, and finally coma, with or without previous or alternating delirium.

There is always febrile excitement. There is a characteristic tremulousness which has been compared to the unequal vibrations of a cord moderately stretched. Respiration, although not affected at first, later becomes irregular and stertorous, and finally asphyxia may take place. Constipation is a prominent symptom; the appetite is capricious, nausea and vomiting are present almost from the first. There may be either retention of urine from paralysis of the bladder, or incontinence from paralysis of the sphincter, or both conditions may coexist, giving rise to constant dribbling. These symptoms may be arranged in five classes, designated by the most prominent featnres of each, as the paralytic, the comatose, the epileptiform, the apoplectiform, and the maniacal. Death ensues from exhaustion or asphyxia, or by the bursting of the abscess into the ventricles or upon the surface of the brain.

Prognosis.—Suppurative encephalitis is invariably fatal, if the disease does not terminate in resolution.

Treatment.—This is altogether palliative. Symptoms such as pain, vertigo and vomiting may be controlled to a certain extent. Considerable benefit may be derived from the extract of Indian hemp, given in conjunction with bromide of potassium. The dose of Squire's extract may range from half a grain to two grains three times a day, with from thirty to forty grains of the bromide of potassium or sodium.

When there is reason to suspect a syphilitic origin, mercury or iodide of potassium may be administered theoretically with some prospect of success, but practically with very little benefit. The medicines should be given in frequently-repeated doses, so as to bring the system as soon as possible under their influence. Calomel is the preferable mercurial. Bloodletting, local and general blisters, tartar emetic, and other measures calculated to depress the powers of the system, are worse than useless.—WILLIAM A. HAMMOND.

BRAIN, Injuries of—*See Head, Injuries of.*

BRAIN, Softening of.—*Causes.*—Cerebral hæmorrhage, obliteration of cerebral arteries and veins and capillaries from embolism and thrombosis. Age is a strong predisposing, if not an actual exciting cause, softening being most apt to occur from the age of fifty to eighty, intense and long continued intellectual exertion, and severe and protracted emotional disturbance, the action of intense cold, blows upon the head, and excessive use of alcoholic liquors are exciting causes of this affection.

Symptoms.—When softening is the result of hæmorrhage, of arterial or venous thrombosis, or embolism, the symptoms peculiar to those affection. are first met with. Thus there are troubles of the sensibility, of the intelligence and the power of motion. Paralysis of motion, loss of sensibility delirium, hallucinations, delusions, impaired memory, aphasia or inability to articulate, emotional excitability, failure of mental power, drowsiness, dull and circumscribed headache, vertigo, sense of fullness, weight and constriction of the head, death is preceded by coma, convulsions, delirium or a combination of these phenomena.

Prognosis.—Cerebral softening in general ends in death; nevertheless, the prognosis is not altogether hopeless. If the patient be young, of good constitution, and of temperate habits there is a possibility of a favorable termination.

Treatment.—The treatment should depend very much upon the cause from which it has arisen, and must be directed against the symptoms which are manifested. Thus if there is reason to suspect the existence of thrombosis or embolism, and a consequent anæmic condition of a portion of the brain, the judicious use of stimulants and tonics is advisable, while the body should be kept warm by additional clothing, or the application of artificial heat; at the same time the recumbent position should be assumed, and the head supported on a low pillow. Mental exertion should be absolutely interdicted. If there be much headache, the bromides may be given in large doses. The convulsions and delirium are also best treated by the bromide of potassium in doses of thirty grains every three or four hours. In that form of softening which is obscure in its origin and gradual in its progress there is more hope of a favorable result. Phosphide of zinc in doses of a tenth of a grain with half a grain of extract of nux-vomica in pill, three times a day, with the constant galvanic current three times a week, the latter to be derived from fifteen of Smee's cells and to be passed from forehead to occiput for three or four minutes at a time. A liberal allowance of wine, full and nutritious diet, carriage exercise, amusements, and the following preparation of phosphorus are all agents which may be employed with advantage:

℞ Olei phosphorat.. ℥ ss
Mucil. acaciæ.. ℥ j
Ol. bergamii...gtt xv
M. Ft. emulsio. Dose. gtt. xv ter die. William A. Hammond.

BRAIN, Tumors of.—*Varieties.*—Vascular, parasitic, diathetic, tuberculous, syphilitic, and accidental.

Causes.—These vary with the kind of tumor. The exciting causes of vascular tumors, are, blows on the head, falls, sudden and great physical exertion, intense emotion, mental labor, embolism, and concentric hypertrophy of the heart. Parasitic tumors are caused by the migration of the embryos of the cysticercus, and echinococcus from other parts of the body. Diathetic tumors are either cancerous, tuberculous, or syphilitic in character. Accidental tumors may be caused by injuries, and are more common after the age of forty.

Symptoms.—There may be none. When present there is localized pain, of varying degree and intensity, from a dull ache to a lancinating paroxysm. Sight and hearing are affected, and not infrequently taste is perverted or lessened in acuteness. Anæsthesia or hyperæsthesia of the face or extremities is usually present. Vertigo, nausea and vomiting, convulsions or paralysis of slow progress and usually of the hemiplegic form, indistinct speech from paresis of the vocal organs, disturbances of equilibrium, and if the intellectual faculties are involved there is gradually advancing imbecility. Death takes place in coma or convulsions or a combination of both.

Prognosis.—Except when due to syphilis the prognosis is uniformly fatal. Aneurismal tumors are occasionally spontaneously cured, and if the proper treatment is adopted early in the cases of syphilitic tumors there is considerable prospect of recovery.

Treatment.—So far as tumors of the brain other than syphilitic are concerned there is no treatment calculated to cure the patient. The induced galvanic current is beneficial in restoring contractility to the paralyzed muscles. When applied to the eye, the lids should be closed, one electrode, a wet sponge, is placed on them, the other is held in the hand or placed on the nape of the neck, and a current not so strong as to cause any considerable pain is then allowed to pass through the intervening tissues. For the relief of the pain attendant on cerebral tumors morphia may be administered hypodermically, or what has been found advantageous in several cases the extract of Indian hemp may be used.

When the tumor is syphilitic in character the following is an eligible form for administering the mercury and iodide of potassium:

℞ Hyd. bichlor. corros..................................gr. ij
Potass. iodidi... ʒ v
Aquæ... ℥ iv
M. Ft. sol. et. sig. *Teaspoonful three times a day.*
William A. Hammond.

BREAST, Diseases of.—ABSCESS OF THE MAMMA.—*Definition.*—Suppuration following inflammation, either simple or affecting a large portion of the breast, producing several centres of suppuration.

Causes.—Chill during nursing, or a sequela of puerperal mischief.

Symptoms.—Deep-seated aching pain, sometimes without much tenderness.

Signs.—The breast swollen, hard, purplish; the skin threatening to become disorganized.

Diagnosis.—By the fluctuation and the history of preceding inflammation.

Prognosis.—Favorable.

Treatment.—Deep and free incision; care being taken not to cut across the lactiferous ducts, and to keep the wounds open to allow of the free escape of the pus.

N. B.—Cold chronic abscess needs careful diagnosis to differentiate it from simple cyst. It should be laid freely open, and stimulating applications, as iodine, applied to the interior of the abscess.

ATROPHY OF THE MAMMA.—*Definition.*—Male type of breast. *Causes.*—Non-development of the ovaries, old age. *Symptoms.*—Anenorrhœa. *Signs.*—The breast remains flat or slightly flat, and the nipple small. *Diagnosis.*—As above. *Prognosis.*—Unfavorable. *Treatment.*—Galvanic intrauterine stem; leeches to the uterus.

CANCER OF THE MAMMA.—*Definition.*—Cancer affecting the mammary gland, or the interlobular connective tissue. *Causes.*—Unknown. Exciting: blows, arrest of secretion, heredity. *Symptoms.*—Pain of a lacinating, intermittent character, sense of weight; afterwards cachexia; occasionally, where the disease is in the connective tissue, there may be but little pain. *Signs.*—A hard unyielding swelling in the substance of the mamma, at first freely movable, afterwards becoming more or less fixed; swelling and pain in the axillary glands; indrawing of the nipple, adherence of overlying skin to the tumor; tenderness; red blush of skin proceeding to purple. In cases of diffuse cancer of the connective tissue, the breast may feel generally somewhat hard without presenting a defined swelling. *Diagnosis.*—From cyst by character of pain. Chronic mammary tumors are free, and do not produce pain; they may remain inactive throughout life. *Prognosis.*—Unfavorable. *Treatment.*—Early removal by the knife, or by Michel's process. In doubtful cases large doses of iodide of potassium, gr. 5 to 20, with purges; leeches. Inunction of iodide of lead ointment or of iodide of potassium; cod-liver oil. Palliative in ulcerated cases: Goulard water, opium externally and internally, carbolic acid ditto, persulphate of iron, collodion.

N. B.—The size of this work precludes all mention of the various and mostly ineffective measures that have been tried at different times for the cure of cancer, and also the enumeration of the various compound forms of the disease.

CHRONIC MAMMARY TUMOR.—*Definition.*—A non-malignant tumor of the breast, generally manifested in isolated tumors, hard, of a fibrous nature, several being often present in the mamma. *Causes.*—Some disorder of menstruation in early life, chill, blows; the tuberculous diathesis. *Symptoms.*—Scarcely any. *Signs.*—Small tumors varying in size from a filbert to a walnut appear to be freely movable in the breast; they feel hard, are not tender, and do not tend to increase. *Diagnosis.*—Sometimes difficult from commencing scirrhus; but as time goes on they do not grow, nor is there any pain, nor do they become fixed, nor tender. *Prognosis.*—Favorable. *Treatment.*—If let alone and the patient has several children, and especially if she suckles, the tumors gradually lessen until they disappear. If the patient does not become pregnant, and the presence of the tumor is a source of annoyance, it is well to apply gentle pressure by strapping with iodide of lead plaster or belladonna, and administer cod-liver oil and iodide of potassium. If their presence disturb the health through nervousness, it is better to remove them.

CYST OF THE MAMMA.—*Definition*—A tumor in the mamma, the result of the presence of a cyst or cysts. They may be of the nature of fibro-cysts, sebaceous cysts, hydatids, serous cysts, sero-sanguineous cysts, or muco-serous cysts. *Causes.*—Blocking of some lobule of the gland, or degeneration of some tuberculous deposit, or the result of some local extravasation of blood or serum. *Symptoms.*—Swelling, with sensation of fulness or weight, no tenderness, and but little pain. *Signs.*—A tumor defined, smooth, with sensation of fluid in a tense cyst, movable. *Diagnosis.*—From chronic mammary tumor by its lesser duration, by sensation of fluid, by its not tending to resolution in pregnancy and suckling. *Prognosis.*—Favorable. *Treatment.*—If distressing to the patient, extirpation. Prior to this operation, aspiration should be tried. In the case of hydatids, early removal.

HYPERTROPHY OF THE MAMMA.—*Definition.*—Undue largeness of the breast from (1) fat, or (2) true hypertrophy of the gland. *Causes.*—(1) Excessive coitus, masturbation; (2) subinvolution of the gland after suckling. *Symptoms.*—Increased weight and fulness. *Signs.*—(1) Large, soft, fairly firm; (2) large, with nodular hypertrophic enlargement of the gland. *Diagnosis.*—By signs as above. *Prognosis.*—Intractable. *Treatment.*—(1) Avoidance of cause, large doses of bromide of potassium, gr. 5 to 30; (2) mercury, emplastrum plumbi iodidi, strapping the breast, tonics.

INFLAMMATION OF THE MAMMA.—*Definition.*—Mastitis. Inflammation (1) in the connective tissue, (2) in the gland, and (3) rare, beneath the gland. *Causes.*—Chill in the lactiferous breast, blows, constitutional cachexia. *Symptoms.*—Deep throbbing, burning pain, restlessness, rise of temperature; less severe if the inflammation is only subcutaneous. *Signs.*—Hard, red if superficial, tender swelling. *Diagnosis.*—From cancer and chronic mammary tumor by the character of the pain, by the history, and by the constitutional disturbance. *Prognosis.*—Favorable. *Treatment.*—Attempt resolution, leeches (?), poultices, anodyne fomentations (belladonna), support to the breast by strapping, calomel (?); on the presence of pus being detected, free incision; tonics.—HEYWOOD SMITH.

BRICKLAYERS' ITCH is similar to bakers' itch (which see) only that it is excited by the irritation of lime. It requires similar treatment to bakers' itch.

BRIGHT'S DISEASE.—*Natural History.*—Several forms of acute and chronic disease of the kidney, usually associated with albumen in the urine, frequently with dropsy, and with various secondary diseases resulting from deterioration of the blood, are now known under this generic term. There exists a large amount of evidence sufficient to regard Bright's disease as partaking of the characters of a general or constitutional disease; and from this point of view it may be yet classified with gout and rheumatism, as a constitutional affection, which culminates in a variety of structural lesions of the kidneys, each of which is accompanied by the persistent separation of more or less albuminous serum from the blood, and by its presence in the urine, the connective tissue, and serous cavities of the body. The urine frequently contains blood, renal structures, exudation material, and desquamative renal products. The kidneys may be either large or small, atrophic or not, with fatty, or albuminous, or lardaceous disease, and altered in various ways as regards the blood-vessels, the urine tubes, and the epithelium. When the constitutional state associated with Bright's disease is fully expressed, there is characteristic anæmia, indicated by pallor of the countenance, a puffy face and œdematous limbs, anasarca or general dropsy, pain in the loins, with more or less albumen in the urine. There is scanty urine and frequent micturition; a sensation of heat and scalding on passing water, dryness, heat of skin, general feverishness and occasional chilliness of the surface, an irritable pulse, generally above the normal standard, emaciation, and progressive debility. Dyspeptic symptoms predominate. There is difficulty of breathing and anæmia-chlorosis. In Bright's disease, as with many others, an undue share of attention has been bestowed upon the prominent local lesions in which the existence of the constitutional state has finally culminated. For example, the anatomical characters of tubercle in phthisis—of cancer growths in the cachexia of carcinoma—of the supra-renal bodies in morbus Addisonii—of the serous effusions into the spinal and other visceral cavities in beri-beri—of the kidney in Bright's disease and mellituria—of the sediments in the urine in oxaluria, lithiasis, and the like, have been so prominently dwelt upon, that a very narrow view is apt to be taken of the important antecedents of these diseases—of the constitutional states under which they respectively become developed, and therefore, also, of the principles which ought to guide the treatment of these respective diseases, and of the means by which their development may be prevented. The disease has been named after the eminent physician of Guy's Hospital, who, in 1837, first drew the attention of the profession to the connection which he observed to subsist between certain forms of anasarca and lesions in the kidneys.

The College of Physicians has not adopted the view which regards Bright's disease as a general or constitutional malady. It is therefore classed under "Diseases of the Urinary System;" and considered under two forms, namely (1.)—Acute Bright's disease, of which the synonyms are, "acute albuminuria," "acute desquamative nephritis," "acute renal dropsy;" (2.) chronic Bright's disease—syn., "chronic albuminuria," with the following subdivisions;—(a.) Granular kidney—syn., contracted granular kidney, chronic desquamative nephritis; (b.) gouty kidney; (c.) fatty kidney; (d.) lardaceous kidney—syn., amyloid disease, waxy disease.

BRIGHT'S DISEASE, Acute.—*Syn.*, ACUTE ALBUMINURIA, ACUTE DESQUAMATIVE NEPHRITIS, ACUTE RENAL DROPSY.—*Natural History.*—Bright's disease in the acute form is an intense febrile disease, which may come on after scarlatina, cholera, measles, erysipelas, alcoholic intemperance, deficient nutrition, with bodily fatigue or mental anxiety, exposure to cold and wet, and is marked by signs of intense congestion of the kidney, with exudation and hæmorrhage into the tubes, and desquamation of the epithelium. The secondary phenomena are uræmic symptoms to a greater or less degree, and in the majority of cases general dropsy. This affection seems to bear a similar relation to chronic Bright's disease that cases of acute phthisis bear to scrofula. In the rapid forms of acute Bright's disease, the products in the urine occur at first in the form of casts—a catarrhal process; so that elements closely allied to pus form in the kidney-tubes. These casts may accumulate and block up the tubes. The kidney is then enlarged, of a white color (the large white kidney of Bright). Acute dropsy is constant, often ascribed to cold, or as a result of scarlatina. Urine may be for a time suppressed, and the little which passes is of a red-brown color, generally from blood. The sediment is abundant and deeply tinged with blood. It contains albumen, blood-casts, and renal epithelium. The sediment is " composed of coagulated fibrine, blood-corpuscles, cells having for the most part the character of renal epithelium, and occasionally crystals of uric acid. Some of the fibrine is coagulated in irregular masses, having no definite form: this is always the case when the hæmorrhage has been abundant and rapid, so that much of the blood has escaped from the kidneys before it has had time to coagulate; but with these masses there will be seen numerous cylindrical bodies composed of fibrine, which, having exuded from the Malpighian bodies, have coagulated in the tubes, and, escaping thence, present solid cylindrical moulds of the interior of the tubes, in which are entangled blood-corpuscles and epithelial cells, which have been shed by a process of desquamation from the surface of the tubes." Such casts, characterized by the presence of recently formed and entire epithelial cells, are known by the name of "epithelial casts"—their average diameter being about $\frac{1}{700}$ of an inch. Death, sometimes after only a fortnight's illness, discloses a large soft kidney, with swollen cortical substance of a dark color, on removal of the capsules, and the surface much injected. It exudes, on section, drops of blood. To the microscope the tubes are opaque, and are filled with lymph-corpuscles and granular matter. Some have lost their epithelium, and are filled with coagulated fibrine, which, if expelled, would form a fibrinous cast.

The urine in the early stages and height of the disease presents intensely febrile characters. It is small in quantity, deeply pigmented, and deposits urates. It contains a variable but usually a large amount of albumen and blood. Urea is augmented, and when it appears to be below the normal amount its exit is impeded, and uræmic symptoms generally increase and prove fatal. When the urine is very scanty, it becomes almost solid by heat. When the disease is about to end fatally, the quantity of water and of the solids decrease, the diminution of the solids being more considerable than that of the water. The albumen decreases least, and is very abundant till the last. When recovery is about to take place, diuresis usually occurs; and often an enormous quantity of water is passed, containing much urea and chloride of sodium. The albumen at the same time diminishes and disappears, and the kidneys recover perfect health.

Treatment.—(1.) Relieve the kidneys as much as possible from the labor of elimination, by avoiding exposure to cold, by keeping the patient at rest in a bed in a room of moderate and uniform temperature. (2.) The food should be scanty, consisting of gruel, arrow-root, milk, or weak broth; pure water is the best drink, and alcoholic fluids are not to be taken on any account. (3.) Free action of the skin and bowels must be maintained. The hot air bath and antimonial remedies are the best agents to effect the first of these conditions, and free perspiration is to be encouraged by bedding the patient in blankets. Antimonial wine may be given in doses of from fifteen to thirty drops every four or five hours. The bowels are to be kept open by the compound jalap powder, in doses of twenty to sixty grains, repeated daily or on alternate days. It may be alternated with podophyllin, or with extract of colocynth, and compound gamboge pill. Mercury is not to be given. (4.) Cupping over the loins relieves pain in the back, and the quantity of urine passed generally increases after eight or ten ounces of blood have been withdrawn in this way from an adult, or two or three ounces from a child three or four years old. (5.) When the tongue becomes clean and the general symptoms improve, mutton broth or good beef-tea may be indulged in; and, as the digestion improves, solid food may be eaten in small quantities, beginning with fish and fowl, and afterwards mutton or beef. (6.) Flannel must be worn next the skin. (7.) Iron is of great service during convalescence, for in such cases the anæmia becomes extreme. Phosphate of iron in the form of syrup, or citrate of iron and quinia, or the ferrum redactum, are the most digestible forms, and they ought to be given in small doses repeated after every diet. (8.) Diuretics are not to be given. Fomentations, consisting of infusion of the leaves of digitalis, may increase the amount of urine, and the amount of albumen may diminish markedly from the use of the tincture of the perchloride of iron.

***BRIGHT'S DISEASE*, Chronic.**—*Syn.*, CHRONIC ALBUMINURIA.—

Natural History.—There are several different forms of lesion in the kidney associated with the phenomena of chronic Bright's disease, distinguished by certain anatomical characters, and by more or less characteristic symptoms throughout the disease. Two at least of these forms may be considered as typical and distinct; and other forms may be recognized as a commingling of these two, but not to be considered as a gradation from the one form into the other. The two forms are essentially different, and never pass by any pathological process from the one to the other.

The subdivisions of the lesions in the chronic form of Bright's disease, as adopted by the College of Physicians, leaves the progressive development of these lesions from one into another an open question. They are as follows:—(a.) Granular kidney—syn., contracted granular kidney, chronic desquamative nephritis, gouty kidney; (b.) fatty kidney; (c.) lardaceous kidney—syn., amyloid disease, waxy kidney; (d.) mixed forms of kidney lesions in Bright's disease.

It is necessary to inquire into the history of each particular case of chronic Bright's disease, so as to ascertain the precise period, if possible, when the general health began to be impaired : and in order to determine the particular morbid condition in which the kidney exists, it is necessary to make an examination of the urine from day to day, determining especially the urea and albumen, and microscopic appearances of the sediment. The general symptoms which are indicative of the several states of the kidney comprised under the general term "Bright's disease" may be comprised under the following heads:—1. Although the anasarca or general dropsy, either or both of which are usually prominent symptoms when a patient with "Bright's disease" seeks medical advice, yet in nearly every instance they have been preceded by other phenomena more or less definite—*e. g.*, febrile excitement, a dry and harsh state of the skin, a quick and hard pulse. It is only in the acute cases that the prominent and characteristic phenomena of anasarca come on with great rapidity, and commence generally with puffiness of the eyelids, or of the whole face, rapidly extending over the rest of the body. In the more chronic cases the œdema generally commences in the lower limbs ; and it is at the same time associated with a pallid condition of the eyelids, and of the looser connective-tissue of the face. 2. Anæmia is another prominent phenomenon indicated by the pallor of the surface of the body and of the countenance. Its progressive appearance may even suggest suspicion of renal disease before the anasarca sets in, especially in patients above the age of from thirty-five to forty, and whose urine ought therefore to be at once examined. 3. Pain in the loins may or not be a sign of significance. Lumbar pains may be considerable in amount, and yet no renal disease may be capable of detection at the time. In most cases no unpleasant sensation is felt in the lumbar region till the anasarca becomes considerable. 4. In the early stages of the affection there is always a very considerable diminution in the quantity of urine passed. But there are many exceptions to the rule, and in some cases the urine is more abundant than usual. Various circumstances concur in determining the greater or less amount of water passed. The amount of albumen in the urine varies much, ranging from 5 to 545 grains in the twenty-four hours ; and in any particular case the amount varies greatly from day to day. It is often increased during the day, from movement or from food, and very greatly increased in the second and third hours after dinner. In the more advanced stage of chronic Bright's disease, instead of the urine being scanty in quantity, and having a tolerably high specific gravity, the quantity passed in twenty-four hours may amount to from thirty-five to fifty ounces or more, being equal to, and in some cases greater than, the average in health. The specific gravity is nearly always below the healthy standard, the urine pale, and in very advanced cases almost colorless. Occasionally it may be red, reddish-brown, pale smoke-brown, or "smoky," as it is commonly described. If the urine is highly fatty, it may have a milky appearance. The specific gravity may range from 1020 to 1025, from two causes, namely—(1.) The presence of serum, which is heavier than urine; (2.) from the small amount of water (relatively). 5. There is nearly always a frequent desire to micturate, especially at night, when the patient is in the horizontal posture, with a sensation of heat or scalding on passing water. accompanied with a discharge of mucus from the urethra, which possesses a more or less puriform character, and appears in the urine in the form of slight thin shreds. 6. Dryness of the skin prevails, and the power of eliminating water by the skin seems impaired. Heat of skin and general feverishness, with occasional chilliness of the surface, and a pulse generally above the natural standard, are common phenomena throughout the later stages of the disease, and when emaciation and debility are progressive. 7. The dyspeptic symptoms which prevail at an early period indicate irritation of the gastro-intestinal mucous membrane. Loss of appetite, sometimes amounting to actual loathing of food, or a capricious and uncertain appetite, are amongst the most prominent phenomena. The food taken rests uneasily in the stomach, giving rise to stomachal and intestinal pneumatosis and acid eructations, the explosive force of the gas so generated being sometimes so great as to cause partial regurgitation of the food. Gastralgia and pyrosis may prevail: and there is very often nausea, retching, aod sometimes vomiting, at occasional intervals. Attacks of diarrhœa are frequent, alternating with costiveness—symptoms referrible to the state of the blood. 8. Dyspnœa is one of the earliest and most pathognomic phenomena of chronic Bright's disease: and this shortness of breath is quite apart from, and independent of, any bronchial catarrh or disturbance in the first instance. The patient observes every now and then how short his breath has become. In an ordinary walk he finds he must stop to recover his breath. Occasionally the attacks occur at nighf, but chiefly during the day, and there is more or less palpitation during the paroxysms; while some wheezing at the chest may also attract the patient's notice. Weeks are thus apt to pass before the patient considers the symptoms sufficiently grave to seek medical advice. If the urine be examined at this early period, the presence of small quantities of albumen may be detected, and the sediment will contain granular casts, with more or less decayed cell-structures. Another case of dyspnœa is the œdema which is apt to set in and pervade the base of more dependent parts of the lungs. It must also be remembered that the lungs, the pericardium, and pleura are organs especially liable to the intercurrent attacks of inflammation in Bright's disease. 9. Symptoms referrible to the nervous system prevail.

The specific gravity of the urine. the albumen it contains when persistent, and the amount of the solid constituents, are the first indications of the real nature of the disease. To determine the albumen, a small quantity of the urine in a test-tube must be slowly and gently heated to the boiling point by the flame of a spirit-lamp, when, if albumen is present, it will appear in the form of a whitish cloud, of which the constituent particles multiply and collect, in proportion as the quantity is considerable, into small curdy fragments or flakes. These will gradually subside to the lower part of the tube when permitted to rest, leaving the supernatant liquor clear, and so indicate approximatively the amount of albumen present. A second specimen of the urine should be taken in another tube, and, after it has been thus boiled, an excess of nitric acid may be poured into the tube, when the albumen present will be precipitated in a flaky or pulpy form. This latter method is the best where the urine to be tested is alkaline; but both methods should be employed in every case; and they are sufficient to determine the presence of albumen. The quantity of albumen present is an important point to be considered, along with the characters of the tubular or organic elements contained in the urine; and in private practice the amount of albumen passed is approximatively judged of by noting the space which the coagulum occupies in the tube after being allowed to rest. The phraseology recommended by Dr. Christison to express the proportions observed by the eye is as follows:—1. Gelatinous by heat. 2. Very strongly coagulable by heat—nearly the whole tube. 3. Strongly coagulable—half the tube. 4. Moderately coagulable—one quarter of the tube. 5. Slightly coagulable—one-eighth. 6. Feebly coagulable—less than one-eighth. 7. Hazy by heat—no visible flakes of albumen.

When the disease is established, and its diagnosis confirmed, much information will be obtained as a guide to treatment, and as an aid to the diagnosis of the peculiar morbid condition in which the kidney may be, by a daily microscopic examination of the urinary sediments.

The following is a general summary of results relative to casts in the urine in Bright's disease:—The blood casts represent more or less active hyperæmia and hæmorrhage from the kidney. The coarsely granular epithelial cast, with its compound inflammation corpuscle, accompanied by amorphous granular flakes stained with hæmatin, represent the period of inflammatory exudation. The finely granular semi-transparent casts, with scattered epithelium and granule-cells, represent the period of subsidence of the inflammatory process. The transparent casts, with compound cells, or with isolated transparent molecules and grape-like clusters of granules, represent a stage of chronic subacute disease of very grave import; and if these casts become more and more loaded with large and gradually increasing fat-granules and oil-drops, the progress of fatal fatty degeneration is clearly marked.

Deteriorating conditions sucn as have been nere described are not limited to the kidney in Bright's disease. There is reason to believe that the nutrition of most of the textures and organs of the body proportionally fails; and although not so apparent, because not manifested in a manner capable of being demonstrated during life, yet the tissues of every organ become more or less degenerate and inefficient for the purposes of life. The cells of the liver are invariably loaded with an abnormal amount of fat in all fatal cases of Bright's disease; and the heart-fibre and arterial textures exhibit the microscopic characters of atrophy and granular or fatty degeneration. Inflammation of the serous surfaces is a common complication.

Treatment.—Every case requires a special study, and a line ot treatment in detail, based on its individual history. A long time is necessary before any appreciable results are obtained, and therefore it is necessary to persist in one line of treatment steadily from week to week, and even from month to month. It is obviously of great importance to be as accurate as possible in diagnosis as to the probable state of the kidney, so as to define the line of treatment from the first which may seem best adapted for the individual case. It is a question of very grave importance how far vomiting or diarrhœa ought to be checked. If either of these occurrences are suddenly stopped (the gastric and intestinal membrane acting at the time as an emunctory for the urea and other excreta of the urine), the patient may be suddenly cut off by convulsions, apoplexy, or effusion into some of the serous cavities, such as the pericardium, or the pleuræ, or the ventricles of the brain. It is necessary, therefore, in the first instance, to determine in all chronic cases the particular organ or tissue which seems in each case to be acting vicariously. The perspirations are often spontaneously profuse; and the skin is by far the safest emunctory for the vicarious elimination of urinary constituents. Therefore it is important to promote the action of the skin if it be deficient, and to encourage it even if it is already considerable. Diaphoretics are always of essential service. So it is always safe to promote the discharge of secretions from the intestinal canal, with due caution that they do not become excessive, so as to pass into persistent diarrhœa. Urea and other constituents of the urine are found in such discharges in large proportions. When general anasarca prevails, absorption may be promoted by gentle pressure, which at all times must be very cautiously applied, and the effects closely watched, for such effusions afford great temporary relief to important symptoms which indicate the involvement of vital organs. Bandaging to promote absorption is not justifiable so long as the anasarca is increasing. Patients ought to be encouraged to go about as long as they are able, care being taken that they are clothed with flannel and woolen garments, and otherwise well protected from cold. The quantity of urea passed by the urine should be determined daily, to ascertain how far the kidneys are capable of secreting and eliminating these excrementitious products. According to the results obtained, the diet must be regulated, and such measures taken as are calculated to reduce the quantity of urea, and other constituents formed daily, to the capacity of the diseased kidneys, for the work they are able to do.

The complications of Bright's disease are extremely difficult to manage. The diarrhœa must not be suddenly checked. Thirty to sixty minims in water of the spiritus ammoniæ aromaticus, with half a drachm of the tincture of kino or of catechu, after very loose stool, will in general be all that is necessary. If there be much griping, the application of a linseed poultice over the abdomen, with two drachms or half an ounce of tincture of opium sprinkled over it, will give relief.

Intercurrent inflammatory attacks and effusions into cavities are still more difficult complications to manage, and are very dangerous to life.

Bronchial complications are serious, and are more or less constantly present. They are frequently the immediate cause of death in chronic Bright's disease. The least stimulating expectorants are to be administered under such circumstances. If the expectoration be viscid, and difficult to discharge, a few drops of antimonial wine may be added to the draught; or if there be much spasm of the bronchial tubes, as indicated by the asthmatic breathing, a few drops of sulphuric or chloric ether may be given. If, on the other hand, the expectoration be purulent and difficult, a few grains of carbonate of ammonia may be given with the oxymel of squills. Flannel next the skin must be invariably insisted on.—WILLIAM AITKEN.

BROMIDE OF POTASSIUM ERUPTION.—The bromides, but particularly the potassium salt, in certain cases, even when only given to the extent of a few small doses, produce eruptions of the skin, which are essentially acneiform in character. The rash may resemble acne vulgaris in general aspect and situation, but usually, if not at first, at least after awhile the limbs or the chest, and even the scalp, are affected. It has always seemed to us that the skin is dirty and greasy looking in persons suffering from bromide eruption. In some cases the acne is more like well-marked acne indurata or ecthyma, since the cellular tissue about the sebaceous glands is more or less actively implicated in the inflammatory mischief about them, and in that case the base of the pustules is hard, tender to the touch, and somewhat painful. In place of any true comedos there is a collection of milky-looking fluid at the apices of the spots, which is very characteristic to those who have learned to recognize it. But there are severer aspects of bromide eruption. Occasionally oblong or roundish, softish, nodular, pinkish or bluish-red swellings, varying in size, appear about the face and neck, or extremities, *perhaps only one or two appear at one time.* In the early stage they seem to be dotted over with yellowish points, indicative of milky or cream-like fluid, really altered sebum, confined beneath the cuticle. These nodules sometimes dry away and crust over, but they may become large, and assume after awhile the aspect of a thickly dark-crusted impetiginous patch or approach the aspect of rupia, after giving exit to a cheesy smegma, perhaps, which is altered sebum mixed with pus. In some cases I have seen decided and considerable ulceration induced. The swellings are painful, and leave behind dark-lined stains, and it may be cicatrices. It is a noticeable feature that in the severer forms of the eruption there are transitional stages present, showing the early and neutrally acneiform character of the eruption, as well as the later nodular and impetigo-like phase. The bromide spots originate in inflammation of one or many adjoining hair sacs or glands, the sebum being altered or increased in amount, periacinous connective tissue being inflamed and indurated. These phases of the eruption are all due to variations in the number of gland sacs, the amount of discharge, inflammation, and crusting present in any given case. Neumann's miscroscopical observations are clear upon this point.

The treatment consists, of course, in withholding bromides from the affected individual, or, where this cannot be secured, in administering moderate doses of arsenic in conjunction with the bromide salt.—*Epitome of Skin Diseases*, *T. Fox and T. C. Fox.*

BROMIDROSIS—*Definition.*—A condition characterized by the odor of the perspiration.

Symptoms.—This disease may be general or local. The former occurs usually in the course of some constitutional disease, when the smell differs according to the variety. Local bromidrosis is normally present in certain regions of the body, such as the axillæ, perinæum, and feet, and it can therefore only be considered a disease when the smell is excessive. When the feet are affected the odor is at times so offensive that the person is unable to attend to his duties, though his general health is perfectly good. The perspiration is greatly increased above the normal, and is quickly absorbed by the socks, from which the smell arises, owing to rapid decomposition.

Treatment.—Local bromidrosis is often very difficult to cure. Thorough cleanliness is essential; the part should be washed at least twice daily with plenty of soap, then dried and powdered with starch or flour. Sea-water baths at night are of value in some cases, and so also is painting the whole part occasionally with iodine. In severe cases, when other measures fail, Hebra recommends the following plan, which he says "will invariably be attended with success:"

"A certain quantity of the simple diachylon plaster (emp. plumbi, emp. lithargyri) is to be melted over a gentle fire, and an equal weight of linseed oil is then to be incorporated with it, the product being stirred till a homogeneous mass is produced, sufficiently adhesive not to crumble readily to pieces. This is then to be spread over a piece of linen measuring about a square foot. The foot of the patient, having been first well washed and thoroughly dried, is now to be wrapped in the dressing thus prepared. Pledgets of lint on which the same ointment has been spread are also to be introduced into the space between each pair of toes, to prevent their touching one another: and care must be taken that the foot is completely covered, and that the dressing is accurately in contact with the skin. When this has been done an ordinary sock or stocking may be put on the foot, and outside this a new shoe, which must be light and should not cover the dorsum of the foot. After twelve hours the dressing is to be removed; the foot is then not to be washed, but must be rubbed with a dry cloth. The dressing is then to be renewed in the same way as before, and its application is afterwards to be repeated twice a day. This procedure must be continued for eight to twelve days, according to the severity of the case. . . . In the course of a few days it will be found that a brownish-yellow cuticle, about ½'' thick, is beginning to peel off from all those parts of the skin which were before affected with the disease, and that a healthy, clean, white surface of epidermis is exposed as this substance separates."—Malcolm Morris.

BROMISM.—*Definition.*—The peculiar condition produced by large doses of the bromides.

Causes.—More or less prolonged administration of a bromide. Age and sex are predisposing causes, children and women as a rule being more readily affected.

Symptoms.—Drowsiness, feebleness of the arms and legs, titubating gait, anæsthesia of the muscular sense, articles held are dropped unless the sight be kept upon them, thick and indistinct speech, frequent and feeble action of the heart, cold, clammy skin, pale countenance, dilatation and insensibility to light of the pupils, red, thickly coated, dry, and sometimes sore tongue, offensive breath, constipated bowels, increase in the quantity of urine, pustules, and occasionally large boils and carbuncles covering the face, neck, back and chest, congestion of the fauces, aphthous patches on the mucous membrane of the buccal cavity, hurried respiration, impaired sensibility of the pharynx and loss of its reflex excitability. The development of these symptoms is succeeded by a state of continual stupor, the urine and fæces are passed involuntarily, the lungs are engorged, the heart becomes still weaker, and if the administration of the bromides is continued, death ensues.

Prognosis.—Favorable if the drug is stopped when grave symptoms are noticed and there are no serious superadded affections present.

Treatment.—There is no special treatment for bromism beyond that which consists in suspending at once the administration of the medicine, facilitating its elimination from the system and sustaining the strength. Digitalis and warm drinks, as infusion of flaxseed, lemonade, etc., may be given, and the strength of the patient sustained with brandy or wine, quinine, beef tea, etc.—William A. Hammond.

BRONCHIECTASIS, Dilatation of the Bronchi.—Generally arises in the course of some chronic lung disease, especially bronchitis, phthisis, and chronic interstitial pneumonia. Its immediate causes are supposed to be: 1. Morbid changes in the walls of the bronchi, diminishing their resisting power. 2. Increased pressure of air from within, either during cough in parts unsupported ; or during inspiration, in consequence of obliteration of a number of air vesicles, the dilatation of the bronchi being then compensatory. 3. Persistent pressure of stagnant secretion. 4. Contraction of lung tissue, in connection with chronic interstitial pneumonia, the inclosed bronchi becoming dilated in the process.

Anatomical Characters.—The bronchi may be extensively dilated, and of a fusiform shape; or they present one or more limited globular enlargements. Their size varies considerably. After a time their inner surface becomes irregular, and occasionally ulcerated; they contain a muco-purulent or purulent substance, which is often fetid; and they are sometimes the seat of gangrene or of hemorrhage. Their contents may ultimately dry up, becoming caseous and even calcareous; and finally the dilated tubes may become obliterated.

Symptoms.—The only significant symptom of dilated bronchi is the occurrence of severe paroxysms of cough, ending with abundant expectoration, which is discharged with much difficulty, depositing a thick sediment on standing, being often exceedingly fetid, and also containing caseous particles. The expired air has generally an extremely foul odor when the patient coughs.

Physical Signs.—The signs of bronchiectasis are: 1. Tubular percussion-sound occasionally. 2. Loud bronchial, blowing, tubular or cavernous breath-sound, which may be heard after a cough when previously absent. 3. Various moist râles, which may be of hollow character. 4. Loud bronchophony or pectoriloquy.

Treatment.—The chief matter requiring attention is to see that the secretions are not allowed to stagnate in the dilated bronchi, the patient being encouraged to cough, and expectoration being assisted. The sputa may be improved and limited in their amount by means of inhalations of carbolic acid or creasote.—FREDERICK T. ROBERTS.

BRONCHITIS.—I. ACUTE BRONCHIAL CATARRH—ACUTE CATARRHAL BRONCHITIS.—ETIOLOGY.—*Predisposing Causes.*—These are: Early or advanced age, indulgence in relaxing and enervating habits, immoderate clothing of children, debility from any cause, the presence of certain constitutional diseases, for example, rickets, gout; chronic pulmonary affections, or previous attacks of bronchitis; cardiac diseases or other conditions which induce overloading of the bronchial vessels; a cold and damp climate or season, especially if liable to sudden changes of temperature; occupations involving exposure, rapid changes in temperature, or the breathing of irritating particles, and residence in the poorer and unhealthy districts of large towns.

Exciting Causes.—1. In the great majority of cases bronchitis results from taking cold in some way or other, such as by exposure to cold and wet, sitting in a draught when perspiring, sudden change in temperature, wearing damp or insufficient clothing, or sleeping in a damp bed. Undoubtedly many children suffer in consequence of the legs and lower parts of the body being so often left unprotected. 2. Direct irritation of the bronchial mucous membrane is another frequent cause, set up by very hot or cold air, irritant gases, mechanical particles in the inspired air, such as cotton, wool, dust, steel; blood, irritating secretions, and morbid growths, *e. g.*, tubercle or cancer. 3. Blood-poisoning may induce bronchial catarrh, as in various fevers, especially typhoid and measles; in gout, rheumatism, or syphilis; after the sudden disappearance of acute or chronic skin affections, or the suppression of habitual discharges, or during the administration of certain medicines, especially iodine. 4. Bronchitis occurs as an epidemic, associated with influenza.

Anatomical Characters.—The morbid appearances directly indicating bronchial catarrh include redness, varying in its hue and arrangement, swelling, opacity, relaxation and diminution in consistence of the mucous membrane; at first dryness of the surface, soon followed, however, by excessive secretion, which changes in its characters as the case progresses, consisting at first of clear frothy mucus, but afterwards becoming more opaque and viscid, muco-purulent or purulent, according to the abundance of cells, and often epithelial abrasions, or even slight ulcerations. Occasionally blood is present in the tubes, or fibrinous particles or casts may be visible.

The appearances will necessarily vary considerably according to the extent, severity and stage of the disease. The redness is most marked towards the upper part of the lungs, and at the bifurcations of the bronchi, but is rarely perceptible beyond their fourth or fifth divisions, and it may disappear after death, owing to the contraction of the muscular and elastic fibres. The inflammatory products are most abundant towards the bases, and in the dependent parts of the lungs; by their accumulation in the air-cells and minute bronchi they sometimes give rise to yellow spots near the surface, especially in children. Both lungs are usually affected, but to an unequal degree.

As complications associated with bronchitis the chief conditions observed are pulmonary congestion and œdema, lobular or more extensive collapse, acute emphysema or insufflation, lobular or rarely lobal pneumonia, and pleurisy. The venous portion of the circulation is liable to be overloaded with dark blood. The bronchial glands are often red, soft, and enlarged.

Symptoms.—It will be necessary to allude to certain varieties which acute bronchitis presents in its clinical history, but in a general way the local symptoms may be summed up as: Unpleasant or painful sensations in the chest, interference with breathing, and cough with expectoration of the materials formed in the tubes. More or less pyrexia is almost always present, while in some cases there is a tendency to suffocation, from blocking up of the bronchial tubes; in others to adynamic symptoms.

1. PRIMARY OR IDIOPATHIC BRONCHITIS: *a. Involving the Larger and Medium Sized Tubes.*—When due to a cold, acute bronchitis is usually ushered in by coryza, sore throat, and some degree of hoarseness, chilliness or slight shiverings, alternating with a sense of heat; general pains and languor; drowsiness with restlessness; furred tongue, anorexia, and constipation. Occasionally slight delirium is observed; or in very young and weakly children convulsions may occur. The symptoms of the established disease are local and general.

LOCAL.—Subjective sensations of heat, burning, rawness, soreness, tickling, or actual pain are experienced to a greater or less degree over the front of the chest, but especially behind the upper part of the sternum, and in the suprasternal notch. These are increased by a full inspiration, and the act of coughing often gives rise to much tearing pain. There may be tenderness over the sternum. Muscular pains are common as the result of cough, especially towards the sides and base of the thorax. A sense of oppression, weight, or tightness across the chest is felt; and respiration may be somewhat hurried and laborious, but there is no evident dyspnœa. Cough is a prominent symptom, being due at first to the irritable condition of the lining membrane, and subsequently to the secretions formed in the tubes. It is paroxysmal in character, often irrepressible and violent, especially on lying down and on waking up in the morning. Expectoration soon occurs, the sputa consisting at first of a little clear, thin, frothy mucus, and afterwards increasing in quantity and becoming muco-purulent, more or less opaque, viscid, and scarcely at all aerated. Sometimes they are very tenacious and adhesive or ropy, and may form distinct "nummulated" masses. As they alter in their characters, they are more easily expelled. Occasionally the expectoration is streaked with blood. Under the microscope epithelial cells, numerous young cells, exudation, and pus-corpuscles are the chief elements observed, along with abundant granular and molecular matter; sometimes a few blood disks, fibrinous coagula, or crystals are visible.

GENERAL.—If the bronchitis is at all extensive, a certain degree of pyrexia is present, but is never very marked. The patient frequently feels very languid and weak. Other mucous membranes are often the seat of catarrh along with that lining the bronchi.

b. BRONCHITIS EXTENDING INTO THE MINUTE TUBES—CAPILLARY BRONCHITIS.—In most cases this form of bronchitis is but an extension of that already described, being preceded by its symptoms, but sometimes the smaller tubes seem to be affected at the same time as the larger, or quite independently, and then well-marked rigors may occur at the outset, with headache and vomiting. The peculiar features of capillary bronchitis are as follows: 1. Pain is often slight or absent, except the muscular pains resulting from cough, which are very severe. 2. Breathing is always greatly distubed, being accelerated sometimes to 50 or more per minute; it is wheezing or crepitous in character, and attended with effort, as well as with a considerable sense of want of air. The pulse-respiration ratio is altered, being in some instances about 2.5 to 1. Urgent dyspnœa is observed in severe cases, either constant or paroxysmal, which may amount to orthopnœa. 3. Cough is exceedingly frequent and violent, and during the act patients often sit up or bend forward, and hold their sides. 4. Expectoration is very difficult, the sputa being abundant, as well as usually viscid and tenacious, containing also minute fibrinous casts of the tubes. 5. The general symptoms are of an aggravated character, there being at first considerable fever, the temperature occasionally rising to 103° or more, with much exhaustion and weakness. The urine sometimes contains a little albumen, or a trace of sugar. As the case advances, the tendency is to the development of the usual symptoms indicating suffocation and venous congestion, usually gradual in their onset, occasionally rapid or sudden, owing to the speedy filling up of the tubes, the cough diminishing, the breathing becoming shallow, and the expired air cool. In some instances, however, typhoid symptoms set in; or there may be a combination of both classes of phenomena.

It is necessary to allude to certain individual peculiarities. Children are very liable to show signs of deficient blood aeration, even in the slighter forms of bronchitis, especially if they are feeble and badly nourished or rickety, because they cannot expel the sputa. They usually swallow any materials coughed up, and, therefore, in order to examine the expectoration, it is necessary to wipe the base of the tongue with a handkerchief after a cough. Healthy adults do not suffer nearly so severely as a rule. In aged persons, or in those who are constitutionally weak from any cause, the fever is very apt to assume an adynamic type, even though the bronchitis is not extensive. The term peripneumonia notha, formerly much employed, properly includes cases of capillary bronchitis occurring in old or weak subjects after some chronic malady, attended with febrile symptoms at first, signs of adynamia and deficient aeration of blood setting in, however, at an early period.

2. *Secondary Bronchitis.*—This term is applied to bronchitis occurring in connection with the exanthemata; in the course of blood-diseases, such as gout, rheumatism, Bright's disease; or in cases of chronic pulmonary or cardiac affections. In nearly all these conditions the complaint is apt to come on very insidiously, without any of the usual symptoms being at all prominent, and it is often a dangerous complication. The expectoration is said sometimes to contain peculiar materials which accumulate in the blood, for instance, uric acid in cases of gout. Pulmonary deposits usually give rise to localized bronchitis. When acute bronchitis complicates emphysema and chronic bronchial catarrh, especially if associated with cardiac disease, urgent dyspnœa and signs of apnœa are likely to set in speedily, accompanied with general venous congestion and dropsy; the expectoration is also very abundant and frothy at first in these cases, and subsequently its discharge may be exceedingly difficult.

3. *Mechanical Bronchitis.*—When due to the inhalation of irritant particles, the attacks of bronchitis are of frequent occurrence, but comparatively slight in degree, there being no pain or fever, the chief symptom being an irritable cough with but little expectoration, which may contain some of the particles breathed.

It must be remembered that the complications previously mentioned may be present in cases of bronchitis, modifying the symptoms, as well as the physical signs, which now remain to be considered.

Physical Signs.—1. The chest may be somewhat enlarged, from insufflation of the lungs. 2. Respiratory movements are more or less quick, frequent, and deep; expiration is sometimes prolonged, and if the tubes are extensively filled, the upper part of the chest moves unduly. In children signs of inspiratory dyspnœa are very common. 3. Rhonchal fremitus is frequently present, varying in its characters. 4. Percussion may reveal increase in extent and degree of pulmonary resonance, on account of distention of the lungs, or occasionally some deficiency of resonance at the bases is observed, due to accumulation of secretion, congestion, and œdema, or collapse. In infants a sound resembling the crack-pot sound may be frequently elicited. 5. Respiratory sounds are loud and harsh, with prolonged expiration where the tubes are free; where these are obstructed, they are weak or absent, or may be completely obscured by rhonchi. 6. The various rhonchi due to the narrowing of the tubes, or to the fluids contained within them, constitute the most important physical signs of bronchitis. They may be of sonorous, sibilant, mucous, submucous, or subcrepitant character, according to the exact physical conditions present, and these adventitious sounds often coexist in different parts of the chest. At first the dry rhonchi are only or chiefly heard, while the moist rales are principally observed towards the bases of the lungs. When fluids collect in the larger tubes, rhonchal sounds may be audible at a distance from the patient. Cough affects them considerably. Occasionally the heart's action may originate rales in the neighboring tubes.

Duration and Terminations.—According to its severity, a case of bronchitis may end in three or four days, or be prolonged for two or three weeks or more. Capillary bronchitis generally proves fatal from the sixth to the twelfth day, death occurring earlier in children than in adults as a rule. There is always the danger of a relapse, or of extension of the inflammation. The terminations are : *a.* In recovery, but in severe cases convalescence may be very prolonged, and cough is liable to remain for some time. *b.* In death, either from gradual or sudden apnœa, or from adynamia. *c.* Occasionally by transition into the chronic state. As sequelæ, emphysema, pulmonary collapse, deformed thorax in children, or acute or chronic phthisis may remain.

Diagnosis.—The diagnosis of the disease of the lungs will be hereafter considered in a separate chapter. At present it need only be remarked that the chief diseases from which acute bronchitis requires to be distinguished are whooping-cough, croupous and other forms of laryngitis, pneumonia, especially lobular, and acute phthisis. It is of importance to recognize any complication occurring during the course of an attack, and also not to mistake bronchitis associated with one of the exanthemata for the sole complaint.

Prognosis.—Bronchitis is often a very dangerous disease, and stands high as a cause of death in this country. The circumstances which increase its gravity are : Very early or advanced age, a bad state of health, or the existence of some chronic or acute disease of a general character; previous organic mischief in the lungs, especially extensive emphysema; the presence of disease of the heart; extensive implication of the smaller bronchial tubes, with great difficulty of expectoration; signs of accumulation of materials in the tubes, with shallow breathing and cessation of cough, or of their extensive obstruction, the latter to be especially looked for in children; urgent dyspnœa, with evidence of apnœa; the presence of adynamic symptoms; the occurrence of dangerous complications; neglect of treatment; and a low epidemic type.

Treatment.—Early attention is required in all cases of bronchitis, but especially when children are affected. Confinement to the house or even to one room is advisable, and if the case is at all severe the patient should remain in bed, warmly clad in flannel, avoiding exposure of the chest, the room being kept at a temperature of from 65° to 68°, and it may be necessary to moisten the air by means of steam. When the attack results from a cold, it is useful at the outset to induce free perspiration by means of copious hot drinks, aided by a warm foot-bath, to which may be added a little mustard, or a hot-air, vapor, or Turkish bath may be employed, the patient then going to bed, and lying between blankets, covered with abundant bedclothes. A full dose of Dover's powder may be given, or a saline diaphoretic draught. A sinapism over the chest is useful, and if the larynx is at all involved, steam inhalations should be resorted to. An emetic at the outset is in much favor with some practitioners in severe cases, and might occasionally be serviceable in the treatment of children.

Should the symptoms not subside, the indications are: 1. To subdue the inflammation as soon as possible. 2. To promote the discharge of the materials forming in the tubes, and to diminish their quantity if they are excessive. 3. To relieve unnecessary cough. 4. To allay spasm of the bronchial tubes if present. 5. To pay attention to the constitutional condition, and to support the strength if it fails. 6. To treat apnœa, excessive fever, or adynamia, should either of these conditions set in. 7. To attend to complications.

1. For the purpose ot fulfilling the first indication, general or local bleeding, and the administration of tartar emetic, tincture of digitalis, or tincture of aconite, are the chief measures advocated. Venesection is very rarely required or admissible, but moderate local bleeding, by means of leeches or cupping, may be occasionally beneficial, though much discrimination is necessary in adopting this measure. The front of the chest and the posterior base are the sites from which blood may be taken with most advantage. The application of two or three leeches sometimes proves highly efficient in relieving severe dyspnœa in plethoric children.

Tartar emetic is decidedly valuable in the early stages of severe cases of bronchitis, provided the patient is strong, and not too old. It may be given with liquor ammoniæ acetatis, and a few drops of compound tincture of camphor, in doses of ¼ to ½ for an adult. Tincture of digitalis and tincture of aconite have been well spoken ot, and are deserving of more extended trial.

2. The next three indications are carried out mainly by the administration, in various combinations as they are required, of : *a.* Expectorants, viz., at first vinum ipecac., tincture or syrup of squills, compound tincture of camphor, and later on carbonate of ammonia, chloride of ammonium, infusion of senega or serpentary, ammoniacum, galbanum, or tincture of benzoin. *b.* Sedatives and narcotics, especially opium or morphia, henbane, conium, hydrocyanic acid, or chlorodyne. *c.* Antispasmodics, such as the various ethers, tincture of lobelia, or spirits of chloroform. Each case of acute bronchitis must be studied carefully, and the remedies varied according to its requirements. They may be combined with demulcents or diaphoretics. Should the tubes be much loaded, and expectoration be difficult, narcotics, particularly opium, must be avoided, and the patient should lie with the head high, and should be encouraged to cough frequently, not being allowed to sleep for too long a time. It is especially necessary to attend to these matters in the treatment of children. Should there be indications of dangerous accumulation, an emetic of sulphate of zinc is very useful. On the other hand, if there is an irritable cough, it may often be voluntarily repressed by the patient, and sedatives are then most valuable. Inhalations are frequently beneficial, those of conium, ether, hop, or benzoin, for the purpose of relieving cough and checking spasm ; later on those of tar, creasote, or carbolic acid to diminish or improve the sputa.

3. Local treatment is generally called for. Repeated sinapisms, hot or turpentine fomentations, and linseed-meal poultices over the chest are beneficial at first. When the acute symptoms have subsided, blistering may be useful ; or, if there is a tendency to chronic catarrh, some more

powerful application may be required, turpentine or croton oil liniment being the most efficacious. Free dry cupping frequently relieves troublesome dyspnœa and oppression about the chest, especially when acute bronchitis complicates emphysema with chronic bronchial catarrh. In these cases flying blisters and turpentine stupes are also very serviceable.

4. The constitutional conditions chiefly requiring attention in cases of bronchitis are general debility, rickets, tuberculosis, and gout. Lowering treatment is not borne when either of these is present. It is quite needless to keep patients on too low a diet, and considerable support is often called for in bad cases. Stimulants are not requisite as a rule, and may do harm, but they must be given if necessary, particularly if signs of adynamia or apnœa set in, their effects being carefully watched. Excessive pyrexia calls for full doses of quinine. Any tendency to asphyxia must be combated by the usual measures.

5. In the treatment of children one of the best remedies in most cases is ipecacuanha wine in moderate doses, repeated every three or four hours. When bronchitis attacks old people or those who are enfeebled from any, cause, or when it occurs as a secondary complication, wine or brandy and abundant nourishment are usually required, and a mixture should be given containing carbonate or muriate of ammonia, ether, or spirits of chloroform, and tincture of squills, with camphor mixture, decoction of bark, infusion of senega, or ammoniacum mixture. Capillary bronchitis in the majority of cases demands a stimulant and supporting treatment.

6. Proper precautions must be taken until convalescence is thoroughly established, especially against cold, damp, and night air; while flannel should be worn next the skin. Tonics are often useful during recovery, such as quinine, mineral acids or iron. Due care must also be exercised in the case of those who are subject to bronchitis, and for such persons a change to some genial climate during the winter season is very desirable.

II. CHRONIC BRONCHITIS—CHRONIC BRONCHIAL CATARRH.—*Etiology.* —As a rule chronic bronchitis follows repeated attacks of the acute disease, but occasionally it remains after one attack, or begins as a chronic affection. It is frequently associated with gout and other constitutional complaints, chronic lung diseases, heart affections, causing pulmonary congestion, or chronic alcoholism; or it results from breathing irritant particles. Persons advanced in years are by far most subject to chronic bronchial catarrh, but even children are liable to suffer.

Anatomical Characters—When this complaint has been long established, it leads to considerable changes in the bronchial tubes. Their lining membrane becomes dark-colored, often of a venous hue, or here and there grayish or brownish; and the capillaries are visibly enlarged and varicose. Thickening of tissues, increased firmness, amounting in some instances to marked induration, and contraction of the tubes are observed, with loss of elasticity and muscular hypertrophy. The cartilages may ultimately calcify. The tubes are narrowed or closed up; the larger being often dilated and gaping on section. The surface of the mucous lining is uneven, frequently presenting extensive epithelial abrasions, or occasionally follicular ulcers. In some cases there is only a little tenacious mucus in the tubes, but usually they contain abundant muco-purulent or purulent matter, or frothy mucus.

Symptoms.—Cases of chronic bronchitis present much variety as regards the severity and exact characters of their symptoms, depending upon the extent of the affection; and upon its frequent association with other morbid conditions in the lungs, especially emphysema, dilated bronchi, or phthisis; with cardiac affections; or with some constitutional diathesis. They may, however, be conveniently classed under three groups:

1. *Ordinary Chronic Bronchitis.*—In many instances patients only suffer from this complaint during the cold season, having a winter cough; but after awhile the symptoms often become permanent to a greater or less degree, being liable to exacerbations in cold and damp weather. A little uneasiness or soreness may be felt behind the sternum, increased by coughing; and a sense of oppression across the chest, with shortness of breath on exertion, is usually experienced in severe cases. Cough is the main symptom, occurring chiefly in paroxysms, varying greatly in severity and frequency; it is often very annoying on first going to bed, and early in the morning. The cough is attended with expectoration, the sputa being frequently abundant and difficult to expel; and consisting of grayish mucus, yellowish or greenish muco-purulent or purulent matter, or a mixture of these materials, usually running into one mass, but occasionally remaining in separate lumps, which may be nummulated. Being but slightly aerated, the masses not infrequently sink in water. Occasionally blood-streaks are observed. Sometimes a most offensive or even gangrenous odor is given off, supposed to be due to decomposition of the sputa, or to the presence of microscopic sloughs. The microscope reveals much granular matter, with imperfect epithelial and pus-cells, and often blood-corpuscles.

Severe cases may be attended with considerable wasting and debility, as well as with slight evening pyrexia and nightsweats, but when these symptoms are present, phthisis should always be carefully looked for.

2. *Dry Catarrh—Dry Bronchial Irritation.*—This variety is particularly observed in connection with gout or emphysema; as a result of irritant inhalations; and in seaside places. More or less dyspnœa is experienced, with a sense of tightness across the chest and wheezing; and very distressing paroxysms of irritable cough come on, either quite dry, or only followed by the expectoration of a small pellet of grayish, pearl-like, tough mucus, compared to boiled starch, or of a little watery fluid.

3. *Bronchorrhœa.*—Most frequent in old people, especially in connection with cardiac diseases, this form is characterized by the expectoration being very abundant, sometimes amounting to as much as four or five pints in the twenty-four hours; in character being either watery and transparent, or glutinous and ropy, resembling a mixture of white of egg and water, and scarcely at all frothy. The cough is paroxysmal and often violent, but may be insignificant, compared with the quantity of fluid discharged. Patients frequently obtain relief from dyspnœa and other unpleasant sensations after a spell of coughing. In severe cases there may be loss of flesh, and proportionate weakness.

Physical Signs.—The only signs directly due to chronic bronchial catarrh are: 1. Rhonchal fremitus. 2. Harsh respiratory sounds, with prolonged expiration. 3. Sonorus and sibilant rhonchi, with large mucous râles towards the bases, the latter being rarely abundant, and varying in characters according to the consistence of the contents of the tubes. Other signs are generally present in cases of long duration, but they are dependent upon emphysema and other morbid changes accompanying the catarrh.

Prognosis.—When chronic bronchitis is confirmed, only rarely can the complaint be thoroughly cured. In less advanced cases, however, complete restoration may be effected if due precautions are exercised. Patients suffering from chronic bronchitis often live to a good old age, but lead an uncomfortable existence. The chief dangers to which they are liable are that the disease should become more extensive, or should induce emphysema, dilated bronchi, collapse, or phthisis; or that an acute attack might supervene, which is frequently highly dangerous.

Treatment.—1. From what has just been stated, it is obvious that all cases of chronic bronchitis ought to be thoroughly attended to at as early a period as possible. The patient must be removed from every source of irritation, and must observe due precautions against exposure, wearing warm clothing, with flannel next the skin. If a suitable climate cannot be obtained, it will be well for the patient to keep indoors during bad weather; or if obliged to go out, a respirator should be worn in appropriate cases.

2. It is very important to look to the state of the heart, of the digestive organs, and of the general system. If cardiac disease is present, infusion or tincture of digitalis is often very useful. By relieving dyspeptic symptoms, and keeping the bowels freely open, much good may also frequently be effected in cases of chronic bronchitis. Any constitutional diathesis present must be attended to, especially gout, rheumatism, rickets, or tuberculosis; and a plethoric or anæmic state of the blood should be corrected. A great many cases of chronic bronchitis do well under a course of treatment by tonics and good diet, with some stimulant, especially if there is abundant expectoration, causing debility and wasting. Quinine, preparations of iron, or mineral acids with bitter infusions are often very valuable, as well as cod-liver-oil. In some cases mineral nervine tonics, such as sulphate or oxide of zinc are beneficial.

3. Much discrimination is requisite in the employment of remedies which have a local action. The main indications are to limit excessive secretion; to assist expectoration, should the act be difficult; to allay irritable cough; and to subdue spasms of the bronchial muscular fibres. The first indication is carried out by the internal administration of chloride of ammonium; of balsams and resins, especially balsam copaibæ, ammoniacum, or galbanum; or of astringent preparations of iron, acetate of lead, mineral acids, tannic or gallic acid; and by employing inhalations of steam impregnated with tar, creosote, carbolic acid, or naphtha; or very dilute dry inhalations of iodine, chlorine, balsamic and resinous vapors, or the vapor of chloride of ammonium. The other indications are fulfilled by means similar to those mentioned under acute bronchitis, and similar precautions must be observed in the use of narcotics, should there be a tendency to accumulation of secretion. If the sputa are very viscid, alkaline carbonates or liquor potassæ may prove beneficial. Sedative inhalations are most valuable should there be much irritable cough. Tincture of Indian hemp is sometimes useful when there is much tendency to spasms.

4. The chest should be covered in front with some warm plaster, or with cotton-wool. Free dry-cupping, sinapisms, blisters, turpentine liniment, croton oil liniment, strong or diluted, chloroform liniment, and other local applications are frequently serviceable.

5. Change of climate or a sea-voyage proves most beneficial in many cases. All forms of bronchitis require a tolerably warm region, which is not subject to rapid changes of temperature, or exposed to cold winds, and which is situated at a moderate elevation. Dry catarrh needs a soft and relaxing atmosphere of moderately high temperature. If thsre is much expectoration a dry, warm and more or less stimulating atmosphere answers best. Torquay, Penzance, Bournemouth, Grange, Clifton, and Tunbridge Wells in this country; and Mentone, San Remo, Pisa, Rome, Cannes, Algiers, and Corfu in foreign countries, are the chief places available foı patients suffering from chronic bronchitis.

III. PLASTIC OR CROUPOUS BRONCHITIS.—*Etiology.*—Young adults suffer most frequently from this rare complaint, and it is stated to be rather more common among females. It is supposed to be due to some diathetic condition, and to be generally associated with a weak constitution, or sometimes with tuberculosis. The affection may, however, certainly be met with in strong and apparently healthy persons.

Anatomical Characters.—A plastic exudation collects in the tubes, forming whitish casts, varying in size according to the tubes affected, as well as in extent; being either hollow or solid; and sometimes presenting concentric layers. It consists of an amorphous or fibrillated substance, inclosing granular matter, oil-globules, and cells, some of which are nucleated. Some pathologists have supposed that the material is merely altered blood, the result of bronchial hæmorrhage, but this is not a correct view, the exudation being probably an inflammatory product usually.

Symptoms.—Plastic bronchitis is almost always chronic in its course, but presents acute exacerbations. The affection is characterized by fits of cough and dyspnœa, more or less frequent, severe, and prolonged, being sometimes extremely aggravated; followed and usually relieved by the expectoration of fibrinous masses, which on being unravelled under water exhibit treelike casts of the tubes. There may be more or less hæmoptysis, which may be on a large scale. Sometimes extensive bronchial catarrh or pneumonia is set up; and considerable pyrexia may be observed. In the intervals patients suffering from this complaint often feel perfectly well.

The physical signs indicate obstruction of the bronchial tubes, more or less complete and extensive, leading to emphysema or pulmonary collapse. Dry rhonchi are often audible on auscultation, especially those of a sibilant character, with a few mucous rales.

A case came under my notice, in which a tolerably healthy-looking young man was affected with plastic bronchitis, bringing up a quantity of casts almost daily, but who scarcely suffered any inconvenience.

Treatment.—During the attacks of dyspnœa and cough associated with plastic bronchitis the use of inhalations; the external application of sinapisms, turpentine fomentations, or a blister to the chest; and the internal administration of sedatives, with tartar emetic or ipecacuanha wine, might be tried. For the cure of the complaint there is no known remedy. Tonics, cod-liver oil, change to a warm climate, or a long sea-voyage seems to be most beneficial. Tartar emetic, iodide of potassium, alkalies and their carbonates, mercury, inhalations of iodine, and various other remedies have been tried, but usually without success.—Frederick T. Roberts.

BRONCHOCELE.—Two kinds, ordinary and exophthalmic goitre; the former may be endemic or sporadic, simple or cystic, and it may be acute.

Causes.—Immediate cause unknown, but certainly poverty and an unhealthy mode of living greatly conduce to it.

Character and effects.—Enlargement of the thyroid gland or part of it, fluctuating if cystic; occasionally causes dyspnœa, dysphagia, or loss of voice, or displaces neighboring parts; cysts usually contain serous fluid when single, grumous fluid when multiple.

Exophthalmic Goitre.—Pulsation, anæmia, prominence of eyeballs.

Diagnosis may have to be made from carotid aneurism.

Treatment.—General hygiene; high, dry, breezy places; iron, iodide internally and externally; iodide of potassium; lead iodide and mercuric iodide ointments; pressure; tapping cysts and injecting them with iodide or iron tincture (ʒ j to ʒ ij with water); pressure; seton (dangerous); ligature of thyroid arteries; excision when pressure of tumor threatens death; for acute bronchocele, if the pressure gets dangerous, tap any cysts and divide the binding cervical fascia. D'Ancona claims to have cured a case of exophthalmic goitre by galvanization of the cervical sympathetic.—(*Dublin Journal*, Feb. 1878).—C. B. Keetley.

BROW AGUE—*See Neuralgia.*

BRUISES.—*Possible after-consequences.*—Abscess, contraction or shrivelling (*e.g.*, of the ear after hæmatoma), permanent thickening, long-continued pain and tenderness, paralysis of nerve or muscle, necrosis or hypertrophy of bone, a weakness and liability to disease.

Treatment.—Pressure, uniform, equable and tight, especially by cotton-wool and starch bandage; stimulating liniments, ice, cold lotions; or, in severe cases, warmth and exclusion from the air. Rest. When the effusion remains, try friction, kneading, or pressure, or tap antiseptically.

BUBO.—*Causes.*—Syphilis (suppurating bubo caused by the soft chancre), gonorrhœa and any irritation about skin of external genitals. When there has been no visible sore, the bubo is called a "sympathetic" one. "Bubon d'emblee" means a syphilitic bubo from absorption of virus, without intermediate ulceration; scrofulus constitution or severe local disease of genitals aggravates bubo.

Symptoms.—Those of inflammation and sometimes suppuration of and around the inguinal glands; suppuration may greatly undermine and destroy skin; chronic or acute.

Diagnosed from deeper abscesses by its connections, situations, history and course.

Prognosis.—Proper treatment will often prevent abscess; liability to slough and open arteries.

Treatment.—1, To prevent abscess: rest, counter-irritation, blisters, iodine paint, ex. belladon. and glycerine on cotton wool, pressure, cold, leeches. General treatment for cause: attend to bowels, quinine, iron. 2, when abscess forms, poultice, foment, then open freely; destroy rotten skin; stimulating ointments, red oxide of mercury powder or ointment, ung. resinæ, caustics when required; iodoform.

Creeping Bubo heals at one side, extends at other; horse shoe shape.—C. B. KEETLEY.

BUCKET—*See Dengue.*

BUCNEMIA TROPICA—*See Elephantiasis Arabum.*

BUNION.—Thickening of bursa over head of metatarsal bone of great toe; occasionally the term is applied to any enlarged bursa on the foot.

Symptoms.—First a tender spot, then swelling, effusion, liability to inflammation; suppuration, sinus, large cavity with narrow orifice, thin discharge; distortion of toe outwards, displacement of flexor longus pollicis tendon in same direction; changes like those of chronic rheumatic arthritis in the subjacent joint, or more serious articular disease, which may lead to fatal inflammation of the foot; may be starting point of senile gangrene.

Prognosis.—Rarely altogether curable when it has long suppurated.

Treatment.—Rest, remove the pressure of the boot, which is always the cause; restore the toe to natural position by mechanical contrivance; it may be justifiable to divide tendons or ligaments; corn plaisters, soap plaister; iodine or ointments of iodides to produce resolution; when discharging apply stimulating dressing, *e. g.*, ung. resinæ; when inflamed, poultices, fomentations, &c. Nitrate of silver solution will harden tender skin.—C. B. KEETLEY.

BURNS, including **SCALDS.**—Six degrees: 1, cutaneous hyperæmia, like slight erysipelas; 2, blistering; no mark left after recovery, except occasionally a slight stain; 3, true skin partly destroyed; cicatrix, but no contraction; 4, total destruction of true skin: possible or probable great deformity; 5, muscles, &c., destroyed; 6, a whole thickness of a limb charred.

Symptoms—of the last four degrees are locally those of inflamed and suppurating wounds casting off sloughs.

Constitutional Symptoms.—At first, those of shock or collapse; then, within forty-eight hours, commences the second stage (of reaction and inflammation). The third stage (of suppuration and exhaustion) begins in *about a fortnight. In the inflammatory* stage there are fever, and liability to various complications, peritonitis, pleuritis, pneumonia, bronchitis, arachinitis, congestion of brain, ulceration of the duodenum. The symptoms of these special affections are not peculiar, but liable to be obscure. Third stage: hectic, same visceral lesions as those of second stage. Inflammations are of a low type. Erysipelas, pyæmia, and tetanus. Ulceration of the duodenum occurs most frequently in the second stage, and is found in 12 per cent. of fatal cases of burns; its symptoms are epigastric tenderness (not a valuable sign) and hemorrhage from the anus.

Prognosis—Depends on age, extent of surface injured, and, to a less degree, upon depth. Most serious in young children.

Treatment—Locally. Rest; protect part from air; cotton wadding. oil, linseed-oil and lime-water, zinc ointment; or rags dipped in and kept constantly wet with solution of silver nitrate (gr. x ad ℥ j), or with a concentrated solution of carbonate of soda; starch, flour, balsam of Peru, &c. Afterwards the treatment of simple ulceration. Guard against contraction. from cicatrization. *Vide* Cicatrix. Terebene, carbolic lotion, and oakum for offensive discharges. Don't irritate by dressing too often.

Constitutional Treatment.—In stage of collapse: opium, morphia subcutaneously; full doses; stimulants cautiously; warmth; choloroform if necessary at first dressing. In later stages watch for and, so far as the patient's state admits, treat the complications. Warmth externally for convulsions. Opium for diarrhœa, but keep the bowels regular. Blood-letting sometimes for the visceral inflammations. Diet chiefly of milk. Judicious stimulants, good food and tonics often indicated; fresh air.—C. B. Keetley.

BURSÆ.—Situations of chief—acromion, olecranon, great trochanter tuberosity of ischium, beneath psoas, lower, superior, and outer parts of patella, condyles of femur, popliteal space, tuberosity of tibia, and the os calcis. They also occur on almost any hard prominence, especially if subject to pressure, and under any tendon which glides over bones.

Diseased Conditions of Bursæ.—Four, viz., 1, simple enlargement with fluid contents; 2. enlargement and solidification; 3, enlargement and formation of melon-seed bodies; 4, inflammation. As a type of all bursæ, let us take the

Bursa Patellæ.—All the above diseases may occur here, and are the result of undue and repeated pressure. Inflammation may follow a blow only, but especially a blow on bursa already enlarged. 1. Simple Enlargement.—A globular swelling, obviously in front of patella or lig. patellæ, and therefore not in the joint. Fluctuation sometimes, or even transparency. Usually painless. Stiffness. Perhaps no trouble whatever. 2. Solidification.—May be judged by the feel, or detected after incision. 3. Melon-seed bodies may cause a crackling feel. 4. Inflammation causes, heat, redness, &c., and leads almost always to abscess.

Treatment.—For 1. Remove cause, iodine or blistering externally, tapping simply, or with injection of tincture of iodine (ʒ j); seton; free incision with gentle but firm compression. 2. Excise the solid bursa. In dissecting it out, remember the absolutely close proximity of the joint. 3. Melon-seed bodies are to be let out by incision if the bursa is troublesome. 4. For inflammation—leeches, fomentations, poultices, rest, elevation, back-splint. When abscess forms incise freely. Suppuration may cause cellulitis all about the knee, bursting of pus into neighboring tissues or joint, or disease of patella. Enlarged bursa over olecranon often causes diffuse cellulitis of fore-arm. Bursa in popliteal space, and beneath semi-membranosus, very liable to communicate with knee-joint. Hence caution in tapping; antiseptic. Enlarged bursa with liquid contents can be easily reduced by elastic pressure. But this elastic pressure requires experience and care to be used with perfect safety. C. B. Keetley.

CACOTROPHIA FOLLICULORUM.—In the London Clinical Society's Transactions for 1868, Dr. Tilbury Fox has described and figured a disease resembling severe lichen pilaris; that is to say, palish or reddish pimples seated at the hair follicles; but in its severity is a deeper affection of the follicles; in the fact of its being congenital, in its general distribution in severe cases more or less over the body, and in its obstinacy to treatment, it is peculiar. It affects by preference the outer aspects of the arms above the elbow (producing there an appearance like a nutmeg-grater), but also the thighs, the trunk, and the sides of the face and forehead. The follicles are plugged by scales or exuviæ, which can only be detached with difficulty; the hairs are lost, or of the feeblest growth. The interfollicular portions of the skin are healthy. The disease is stated to occur in members of families where ichthyosis is common, and we have found this to be the case. The disease might well be regarded as a xeroderma of the follicles. The treatment consists in giving alkaline baths and rubbing simple oils or greasy substances into the skin, and exhibiting tonics internally, especially cod-liver oil.—*Epitome of Skin, Drs. T. Fox and T. C. Fox.*

CALCIS, Excision of.—*See Excision of Joints.*

CALCULI, Biliary.—*See Gall-Bladder, Diseases of.*

CALCULUS.—*Urinary deposits.*—Table of two classes, organic and inorganic:

NAME	CHARACTERS	CAUSES	SYMPTOMS	TREATMENT
Urates or Lithates of Ammonia and Soda.	Pinkish yellow, red or lateritious (brick-dust sediment; urine scanty, acid, and high-colored. The precipitate, before subsiding, forms a cloud in the urine, which clears off when heated. Crystalline form—uric acid, mostly rhombic prisms and plates. "Gravel."	1. Rapid waste of tissues, *e. g.*, as in fevers; 2, excess in nitrogenous food; 3, dyspepsia; 4, obstructed perspiration; 5. congestion of the kidneys (Golding Bird). Also imperfect respiration. Cold weather will precipitate urates sometimes from healthy urine.	Those of the causes. Sometimes also a slight burning feel in passing water.	Treat the causes. Moderate animal food, plenty of exercise, fresh air, particular attention to the digestion, &c. Fredrickshall and Vichy waters.
	Urates.—Minute spheres with acicular spiculæ of uric acid projecting from them.			
Oxalate of Lime.	Crystalline forms: 1, quadratic octahedra; 2, dumb-bell crystals.	"Nervous exhaustion;" dyspepsia; overwork; mental distress; excess of saccharine food or alcoholic liquors.	Those of the causes. Occasionally, loss of sexual vigor, or disorder of the sexual functions.	Treat the causes Regular diet, exercises &c. Mineral acids.
Phosphates.	1. *Phosphate of Lime.*—White, cloudy mass. Crystals: spherules, dumb-bells, rosettes, oblique hexagonal prisms. 2. *Phosphate of Ammonia and Magnesia (triple phosphate).* Crystals (large); triangular, truncated prisms, four-sided prisms, irregular six-sided plates; stellate crystals when ammonia has been added.	Alkaline urine is the immediate cause. It is caused by injuries and diseases of the bladder, especially paralysis and catarrhal inflammations; renal inflammation; spinal injury or disease, Nervous exhaustion; excessive use of alkalies; the alkalinity of the urine is said to result from the metamorphosis of urea into *carbonate of ammonia.*	Urine is offensive, and often contains muco-pus. Signs of causative disease.	Treat the causes. *See* DISEASES OF BLADDER, &c.

NAME	CHARACTERS	CAUSES	SYMPTOMS	TREATME
Carbonate	Small and delicate crystalline spherules. Drumsticks.	The causes which determine the change of urea into carbonate of ammonia.	No special symptoms known. Deposit rare.	Treat the conditions which accompany it.
Blood.	Urine a dirty-red color: after standing, a slightly flocculent, brownish sediment. Heat coagulates the albumen. There may be blood enough to form a clot; then the urine is dark brownish red. Or the blood may be quite unmixed with the urine.	1. Kidney disease. Calculi, congestion, inflammation, injury, scurvy, the Bilharzia capensis. Malaria may cause intermittent hæmaturia. Blood from the kidney is generally mixed uniformly with the urine, and forms blood-casts. 2. Bladder affections; injuries, stone, tumors. Blood from bladder often flows pure *after* the urine. 3. Urethra: blood pure and comes before or with urine, or without urine at all.	Those of cause. Use Heller's test for blood) Heat urine, then add KHO and heat again. The phosphates then fall down with the coloring matter of the blood. The sediment has a dirty-red color by reflected, and a splendid blood-red color by transmitted light.	Rest and internal styptics, *e. g.*, gallic and sulphuric acids, acetate of lead with opium. Dry cupping the loins also in renal hemorrhage. For vesical hemorrhage use similar treatment and local remedies; ice to perineum and epigastrium and in rectum. Do not catheterize unless there is retention of urine. If the clots will not come away without interference, use, cautiouslv, Clover's exhausting apparatus for lithotomy, or a syringe, and full-sized catheter. Ruspini's styptic.
Pus.	Pus-corpuscles, under the microscope, are spheroidal and granular. The pus generally subsides as a dense layer of a "pale-greenish cream-color," which can be mixed thoroughly with the urine by shaking. Not affected by acetic acid. Forms a translucent jelly when liquor potassæ is added. The urine is albuminous.	Abscess, ulceration, or merely catarrh of any part of the urinary passages. 1. Pus from the kidneys is usually diffused throughout urine passed. 2. Pus from bladder is mostly mixed with mucus. 3. Pus from an abscess is usually variable in quantity, and not equally diffused.	Those of the cause.	Treat the cause.
Epithelium.	Epithelial cells lining urinary passages. See works on general *Anatomy*. Often in form of casts.	Kidney disease. Ulceration or catarrh of bladder.	Those of cause.	Treat cause.

Fibrine is sometimes present in the form of flocculi. Or it may form fibrinous casts of the tubuli uriniferi. Echinococci cysts are sometimes found in the urine. Give turpentine in large doses. The above table has been constructed chiefly with the aid of Thompson, Druitt, and Niemeyer. In cancer of the bladder cancer-cells and debris are sometimes found in the urine.

CALCULI.—There are seven mineral substances of which urinary calculi may be formed. A calculus may consist of several of these materials in layers or of one only. 1, Lithate of ammonia; 2, lithic or uric acid; 3, oxalate of lime; 4, xanthic or uric oxide; 5, cystic oxide; 6, phosphate of lime; 7, triple phosphate. The nucleus or centre of each calculus may be formed first in the kidney or in the bladder, or it may be a foreign body. Poverty, certain localities, and the male sex are great predisposing *causes* of stone in the bladder. Negro race remarkably exempt.

TABLE OF CALCULI.

	PHYSICAL CHARACTERS, ETC.	CHEMICAL CHARACTERS.
Lithate of Ammonia.	Occurs rarely except in children. Grey, smooth, dusty, non-laminated appearance.	Soluble in boiling water. Add HCl to solution and you get a precipitate of uric acid. Heat with potassium carbonate; ammonia escapes. Blow-pipe burns it away.
Uric Acid.	Smooth or warty. Yellowish or brownish. Concentric structure.	Gives off no ammonia when heated with KHO. Evaporate to dryness with nitric acid. Cool, and add a little $NH3$; the characteristic deep purple-red murexide is then obtained. Blow-pipe burns uric acid away.
Oxalate of Lime.	Rough, warty, "mulberry" appearance. Very hard. Dark "blood-stained."	Easily soluble in nitric acid. Boil long in a solution of potassium bicarbonate, neutralize carefully with nitric acid; then white precipitates can be formed with solutions of lime, lead, or silver. Blow-pipe reduces it, first to calcium carbonate, to quick-lime. Heat on platinum foil and it chars. Then add $HNO3$, and it effervesces.
Cystic Oxide.	Has a wavy appearance, especially when fractured. Changes color with age from pale yellow to brown, grey, or green. Extremely rare. Contains sulphur,	Dissolves, in great part, in ammonia; its solution then deposits, by spontaneous evaporation, six-sided prismatic and tubular crystals. Dissolve in strong caustic potash. Boil and add a little solution of lead acetate: a black precipitate of sulphide of lead falls.
Xanthic Oxide.	Section, lustrous bright brown. Most extremely rare.	Has a peculiar deep yellow color, when its solution in nitric acid is evaporated to dryness; characteristic.
Mixed Phosphates of Lime.	Chalky, soft, brittle, laminated.	"Fusible calculus:" melts in the blow-pipe flame. Dissolve in nitric acid and add excess of ammonia: white precipitate.

Phosphate of lime and triple phosphate very rarely occur separately.

Fibrinous calculi smell of burnt feathers when burnt, and are stained bright yellow by nitric acid.

Uric acid forms the nucleus of most "alternating" calculi.

The nature of the stone, while still in the bladder, may be guessed at by considering the urine and any deposit from it. The urates are formed from acid, the phosphates from alkaline urine.

Symptoms of calculus in the bladder.—(Often so trifling as to attract no attention for a long time). 1, Pain radiating from bladder to perineum and in glans penis, especially after micturition; 2, riding or jolting may aggravate the pain by shaking stone about; less pain when prostate is much enlarged; 3, urine sometimes stops flowing suddenly; 4, frequent micturition; 5, in children, incontinence of urine; 6, blood in urine; 7 signs of vesical catarrh: 8, prolapsus ani; 9, priapism. Many of these symptoms are often absent. For physical signs we employ the process called

Sounding.—The sound should have a short, sharply-curved beak, and is best hollow. Warm, oil, and introduce. Hold lightly and gently. Push backwards and forwards, and from side to side. Then turn point downwards, to examine base of bladder. The finger in the rectum, or suddenly letting the urine flow through the sound, will sometimes assist. Points to be ascertained: 1, presence or absence of stone; 2, size; 3, number; 4

nature; 5, whether the stone is encysted or not; 6, state of bladder as to rugosity. Size and number are best found by seizing and measuring with a lithotrite. Nature best judged by considering the urine and the patient's age and constitution. Fallacies result from mistaking a fasciculated bladder, or the feel of some bony pelvic prominence for a calculus. The stone should be heard as well as felt. A stone may be hidden away in a sacculus. It there keeps always in one position, and perhaps is only felt occasionally or not at all. "The surgeon should always remember that when irritation at the neck of the bladder arises from stone, it is referred to the glans penis; when from disease of the bladder, to the organ itself; and when from a disease of the prostate, to the perineum or rectum" (Bryant).

Treatment.—1, Palliative: treat the complications, *e. g.*, vesical catarrh; recumbent position; decoction of triticum repens. 2, Operative: As lithontripsis is not yet of any value, refer to articles Lithotomy, Lithotrity, and Litholopaxy.

CALCULUS IN THE KIDNEY.—*Causes.*—*Vide* Table of Urinary Deposits. *Position.*—They may occur as small infarctions in the tubules, or as stones of various sizes, single or multiple, in the pelvis and calices, often forming a cast of the pelvis and its offsets. *Symptoms and Course.*—Pain in the back; blood, pus, or "gravel" in urine; sometimes intense pain (renal colic), caused by passage of a calculus down the ureter into the bladder; pyelitis. *Treatment.*—When an abscess forms it has been found sometimes practicable and justifiable to cut down upon and remove the stone. For the renal colic, use opium boldly, chloroform, and warm baths.

CALCULUS IN THE PROSTATE.—Origin: either descends from bladder, or forms first in prostate. Number 1 to 100: size, grain of sand to cherry-stone; faceted; color various; consistence, various; structure, usually concentric layers; chemistry, phosphate (rarely carbonate) of lime; position, projecting into or near the urethra usually, but sometimes near circumference of gland, and occasionally even partly in bladder and partly in prostate. *Symptoms.*—Those of irritation, inflammation, or abscess of the prostate, according to their effect; semi-erection of penis, and difficulty in seminal ejaculation. Calculus can possibly be felt by sound in the urethra or finger in rectum. *Treatment.*—Remove if possible by urethral forceps, or operate as for median lithotomy; but do not operate when the calculi are small, very numerous, or only to be felt per rectum. When operating, see if there be any calculus in the bladder also.

CALCULUS IN THE URETHRA.—Usually descends from bladder, but may be formed *in situ* (then usually behind a stricture). *Symptoms.*—Pain, obstruction or retention of urine. If not relieved, dilatation of urethra, extravasation, abscess, and urinary fistula, through which stone may pass. *Treatment.*—1, Push forwards with finger and thumb; 2, extract with urethral forceps, wax bougie, or some specially-devised instrument, if necessary slitting up meatus urinarius; or, 3, push back stone to posterior part of urethra, and do median lithotomy. If there is not serious obstruction, a little patience will sometimes allow the urine to wash the stone right to the meatus within twenty-four hours. In other cases delay is highly dangerous.

CALCULUS IN FEMALE has, besides many of those of male, these special symptoms, viz., 1, bearing-down pains; 2, incontinence of urine. Diagnose carefully from uterine disease, by sounding and vaginal examination. *Prognosis.*—Liability to ulceration into vagina, and consequent vesico-vaginal fistula. *Treatment.*—Remove calculus. Three classes of methods, viz., 1, urethral dilatation; 2, lithotrity; 3, lithotomy. The dilatation is best done with a screw, three-bladed dilator. *Vide* also articles Lithotomy and Lithotrity. Danger of incontinence if the urethra is dilated too much. The limits of size for dilatation should be a diameter of one to one and a-half inch for adults, and half as much for children. Slow dilatation almost always followed by incontinence. (Refer to Walsham, *St. Bart. Hosp. Rep.* vol. xi.)—C. B. KEETLEY.

CANCER.—The term is commonly used as if synonymous with "malignant," and therefore including other new growths besides "carcinomata."

Characters of Malignancy.—A cancer tends to 1, infiltrate neighboring tissues; 2, recur; 3, affect lymphatic glands; 4, be followed by secondary deposits; and if the cancer be left long enough, all these four events are pretty sure to take place. Cancers also tend to soften and ulcerate, and "there is scarcely a tissue or an organ which they may not invade."

Causes.—There can be but little doubt but that hereditary influence has some effect in this as in the liability to most other diseases. Still the cancer at its origin is probably local, and various local irritations, such as blows, smoking clay pipes, decayed and rough teeth, &c., can often be traced as exciting causes. Soft cancer occurs chiefly in youth, hard cancer in middle age. It is certain that affections at first pure chronic inflammations in their nature sometimes pass into cancer

Symptoms.—Those of a new growth differing from an innocent tumor in more or less of the following characters: 1, It tends to infiltrate; 2, to involve neighboring tissues; 3, to attack neighboring lymphatic glands; 4, it grows more rapidly than innocent tumors; 5, it is usually more painful; 6, it tends to soften and ulcerate; 7, it has the peculiar features of one of the varieties of cancer.

Prognosis.—*Vide* Cancer of Breast, &c.—Epithelial cancers kill, on the average, in fifty-three months; schirrus in thirty-two (Sibley). Soft cancer is still more rapid. Cancer kills by, 1, hæmorrhage; 2; interference mechanically with vital organs; 3, general infection of blood and consequent cachexia, &c.

Histology.—Every cancer consists of cells lying in the interstices of a network of fibrous tissue; the network may be close or open, strong or weak; the cells are of two kinds: one, the larger, are of epithelial origin; the other, the "small cell formation," of connective tissue origin. It may here be mentioned that the cells of a sarcoma are all of connective tissue origin, and primarily directly connected with the meshwork in which they lie.—*Vide* Special varieties of cancer. Cancer juice is fluid containing cancer cells and often oil particles and debris.

Varieties of Cancer.—Some of the sarcomata, and, indeed, exceptionally almost any kind of tumor may have most of the characters of malignancy. In these cases, the characters are usually so modified as to cause a condition spoken of as "semi-malignant." But most cancers are *carcinomata.* There are five varieties of carcinoma, viz.: 1, hard; 2, soft; 3, colloid; 4, squamous (ordinary) epithelial; 5, cylindrical epithelial cancer; besides villous, melanotic and osteoid cancers.

CANCER, HARD, SCIRRHUS.—The fibrous part preponderates over the cell elements. *Pathology.*—Hard, section concave, white or gray, dotted with yellow points; no defined margin; juice. Either tuberous or infiltrating; "tuberous" means "forming a distinct nodule." When infiltrating, the neighboring parts are hard, adherent, and often drawn in; infiltration of skin with tubercles a very valuable clinical symptom. Parts of the cancer often atrophy, or even slough. The cancerous ulcer is irregular, fœtid, with thick, hard edges. *Locality.*—Breast, skin, rectum; found also in testicle, tonsil, eye, &c.

CANCER, SOFT, ENCEPHALOID.—Fibrous part small; cells abundant; special characters of other varieties absent; not distinct in nature from scirrhus. If a scirrhus be removed, cancer often recurs as encephaloid. Consistence, often as soft as, or even much softer than, brain; color, white, creamy, or blood-stained. When connected with bone or periosteum, liable to contain bony plates or even a complete bony framework; often contains large blood cysts: may be encapsulated; soft and fluctuating. Puncture lets out blood and often cancer-juice as well. May ulcerate and fungate as a bleeding mass; grows fast and is covered by large cutaneous veins, owing to its obstructing deeper veins; large vessels and nerves not generally compressed; amount of pain, variable; "cancer of young life." *Locality.*—Bones, female breast, eye, testicle; attacks also uterus, bladder, &c.

Cancer, Colloid. Alveolar Cancer.—Its carcinomatous nature doubtful; consists of a stroma of wide meshes, with rounded or oval nuclei; meshes contain a jelly-like substance, besides cells, some of which have concentric laminæ like an oyster shell; to the naked eye this cancer has a markedly jelly-like appearance. *Locality.*—Peritoneum, ovary, breast, limbs, parotid, rectum; in alimentary canal, it is said to arise from Lieberkuhn's follicles.

Cancer, Squamous Epithelial, or Ordinary Epithelioma.—Least malignant of the carcinomata; cells flattened like those of epidermis; tendency to arrange themselves in "nests." First appearance, usually a hard lump or wart, which may be dry for a long time, but usually ulcerates sooner or later. Ulcer has hardened, elevated edges, and often an excavated base; occasionally cauliflower-like; glands slow to be affected; infection of the system slower still. *Locality.*—Places where skin and mucous membrane meet, *e.g.*, lips, eyelids, anus, &c.; also warts on the skin, back of hand, front of leg, prepuce (from irritation of soot), tongue. Life usually destroyed by local causes. Cancer should be removed, even if glands are somewhat enlarged, for the enlargement may be merely the result of irritation or inflammation. If done early, there is fair hope of non-recurrence.

Cylindrical Epithelial Cancer occurs in mucous membranes. Both primary and secondary deposits contain cylinders of cylindrical epithelium, like the structure of mucous membrane itself.

Villous Cancer.—*Vide* Diseases of Bladder.

Osteoid Cancer.—Here not only the primary tumor has a skeleton of bone, but bone also appears in the secondary deposits.

Melanotic Cancer is simply cancer with deposits of pigment in the cells. Its primary seat is usually a part originally highly pigmented, *e.g.*, a dark mole. May be either carcinoma or sarcoma.

Treatment of Cancer.—Constitutional.—Tonics, especially iron. Anodynes necessary in later states. Diet ample and nutritious.—*Local Treatment.*—Support and rest when not actually interfering with it; layer of cotton wool and bandages; iodine, opium, and lead retard growth of tumor; amadou plaister; for sloughing, a bread poultice with powdered charcoal; terebene; wash ulcers with a weak solution of zinc chloride and laudanum; tepid lotion of chlorate of potash to be used frequently; lotion of citric acid said to be sedative to epithelial cancers. For œdema of a limb caused by pressure, soft bandages. For hæmorrhage, perchloride of iron, or ligature of any bleeding artery, or bathing with water as hot as it can be borne. For pain, extract of belladonna with glycerine, locally. Apply to a painful cancerous sore, morphia and glycerine on lint, or iodoform; chloral or morphia internally. Question of operating.—Objects of operation. —1, to prolong life; 2, to give an interval of ease and usefulness. Reasons for not operating.—1, unhealthy condition of patient, *e.g.*, severe kidney or lung disease; 2, diffusion and wide infiltration of a cancer; 3, cancerous cutaneous tubercles; 4, disease of glands which cannot themselves be removed; 5, considerable adhesion of a scirrhous breast to pectoral muscle; 6, more than one tumor (except in rare and chronic cases); 7, cancers beneath scalp. If the conditions are favorable, the sooner the cancer is removed the better. It should be removed freely, the neighboring parts carefully examined, and, in many cases, treated with caustics, *e.g.*, zinc chloride (gr. xx to ℥j). Suspicious glands should be removed entire. Ecraseur instead of knife in cancer of tongue, neck of uterus, &c.; galvanic cautery to cancers of skin; caustics; Maissonneuve's caustic arrows; injection of dilute acetic acid (1 to 3), its efficacy doubtful. Injection of bromine in alcohol (m. v to ℥ j). Esmarch and Billroth have treated cancer, with some success, by increasing doses of arsenic, long continued.—C. B. KEETLEY.

CANCER, Chimney-Sweep's—*See Scrotum, Diseases of.*

CANCRUM ORIS (or Gangrenous Stomatitis).—A phagedenic ulceration of the cheek in childhood (second to eighth year).

Causes.—Usually a sequel of one of the exanthemata; low, damp lodgings, bad air, food, &c.; mercury to excess in feeble constitutions.

Symptoms.—Mild form marked by small gray, sloughy foul ulcers on inside of cheek, with red gums and foul breath. The typical form presents a slough reaching right through cheek; skin white, swollen, hard, with a red blush in centre. Internally, a foul, sloughing ulcer, opening into mouth; foul odor; gums swollen and ulcerated. Child suffers little, and dies comatose. Peculiar moving bodies in blood in a case of Noma;* virulent infectiousness of such blood (Sansom).

Prognosis.—Of the severe form, only one in twenty recovers.

Treatment.—Support strength by enemata if necessary; nitric acid freely to sloughing parts; chlorate of potash lotion to mouth; quinine internally.

CANITIES.—Canities is the term applied to the blanching of the hair, occurring normally as a gradual senile change or suddenly under the influence of severe mental emotions. The change begins at the root of the hair by a diminished formation of pigment, and a papilla which has once produced a gray hair does not usually form colored ones. The sudden alteration is ascribed to a development of air-bubbles in the substance of the hair shaft, which obscure the pigment present in the medullary portion. Sometimes canities occurs as a result of disease of the hair follicles, but after a time the hairs may become recolored.—MALCOLM MORRIS.

CARBUNCLE.—*Definition.*—An acute localized inflammation of the true skin, differing from that in furunculus by the multiplicity of the cores and by the liability of the intervening skin and the subjacent tissues to slough. The constitutional symptoms are usually severe.

Symptoms.—Carbuncle begins as a flattened, slightly elevated swelling of the true skin, slightly red in color, and attended with severe pain and marked fever. Usually there are several points of intense inflammation, that lead to necrosis of the tissues and the formation of "cores." Considerable inflammatory infiltration surrounds the little nodule. As in a boil, suppuration soon commences; but, as the cores usually form only the superficial indications of more extensive subcutaneous sloughs, it has to continue a long time before they are separated, during which lymphangitis, cellulitis, and septic absorption, giving rise to pyæmia, may occur.

Carbuncles appear most frequently on the nape of the neck, buttocks, and external surfaces of the limbs; they occasionally arise on the face and lips, in which situations the liability to phlebitis and fatal septicæmia is very great. They are usually solitary, but sometimes are multiple, and not infrequently a succession of them appears in different parts of the body.

Diagnosis.—Carbuncle can only be mistaken for a collection of boils which have become confluent. The more intense pain and constitutional symptoms, the more extensive subcutaneous necrosis, and the greater proneness to sloughing of the skin will serve to distinguish it.

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* *Noma is a gangrene of the genitals of* female children, analogous to cancrum oris.

Prognosis.—Carbuncle, always an affection of serious import, is especially grave in those suffering from exhausting diseases or in a cachectic condition, however produced. The intense pain, causing sleeplessness, and the nervous exhaustion, the severe fever, the prolonged suppuration, with the special liability to septicæmia, in carbuncle of the face and lip, are all elements which intensify the danger in proportion as they are well marked.

Treatment.—An abundant, nutritious, and easily-digested diet, with stimulants in proportion as the patient is depressed or debilitated, are essential parts of the general treatment. Iron and quinine, or ammonia and bark, as for boils, should be given. As measures of local treatment the free crucial incision, the subcutaneous incision of the nodule, and cauterization with potassa fusa have been advised and practiced. In the early stages Hebra recommends the application of cold, by means of ice bladders, to check the extension of inflammation and subsequent suppuration. Poultices and warm poppy fomentations, with some antiseptic, such as carbolic acid or thymol, to lessen the risk of septic absorption and to promote the separation of the sloughs, are undoubtedly useful. These measures are probably quite as efficacious as the more active treatment mentioned above.—MALCOLM MORRIS.

CARIES—*See Bones, Diseases of.*

CARPAL BONES, Dislocation of—*See Dislocations.*

CARTILAGES, Loose—*See Joints, Diseases of.*

CASTRATION.—Required for malignant or other hopeless disease of the testicle. Scalpel; forceps; artery forceps; catgut ligatures for scrotal vessels; whipcord ligature for cord; suitable dressings. Hold testicle in left hand so as to tighten the scrotum; incise skin, etc., from external abdominal ring to bottom of scrotum, so as to expose testicle; pull down the cord, and put whipcord ligature tight round it. In cancer cases, dissect upwards, and tie cord as high up as is safe. Cut cord a quarter of an inch below ligature; a touch or two of knife then liberates testicle.

Prognosis.—Operation very safe. Peritoneal process has been opened in a child, causing fatal peritonitis.—C. B. KEETLEY.

CATALEPSY.—By this term is meant an attack of loss of sensation and of consciousness, attended with a remarkable stiffening of the muscles. The patient for the most part is attacked suddenly, after more or less mental or emotional disturbance; she becomes pale and corpse-like, the respirations being slow and tranquil; the pulse soft. She cannot be roused, and is entirely insensible to pain. But the most striking phenomenon is the stiffness of the muscles, which is such that the limbs, head and neck, or features, when forcibly put into any position, however constrained and unnatural it may be, or however difficult to be supported by the healthy muscles, retain that position some length of time. But although the patient appears to be unconscious to external impressions, and to remember nothing of what happens during the attack, she will sometimes sing or talk whilst it is upon her, or indicate by her expressions the presence of pleasing or painful impressions. A cataleptic condition may also occur in patients who still retain their full consciousness. Cataleptic attacks may last from a few minutes to several days, there may be a single attack only, or they may recur with more or less frequency.—JOHN SYER BRISTOWE.

CATARACT is an opacity of the crystalline lens. Various classifications are used. The following is perhaps the best: (1) Central; (2) Cortical; (3) Lamellar; (4) Capsular; (5) Traumatic; (6) Secondary.

1. Central or Nuclear.—Opacity begins at centre and shades off towards circumference. It mostly occurs in old people, when it is hard at the centre and of amber color. When occurring before the age of 35 it is softer and whiter.

2. Cortical or Radiating.—Opacity begins at surface of lens as triangular or pyramidal streaks pointing towards centre. When advanced they involve whole structure of lens.

3. Lamellar or Zonular.—Opacity consists of a shell-like layer deposited within the substance of the lens at a variable distance from its surface. It occurs in very young subjects (one to three months), and is sometimes congenital; the subjects of it frequently suffer from infantile convulsions.

Capsular.—(*a*) Pyramidal; (*b*) Posterior Polar. (*a*) *Pyramidal.*—Occurs as a very white, well-defined opacity on front part of lens, just beneath the capsule. It is generally caused by ulcer of cornea following purulent ophthalmia, and, consequently, is generally associated with opacity of cornea. (*b*) *Posterior Polar.*—Begins at posterior part of chief axis of lens and radiates; generally associated with disease of choroid and vitreous.

5. Traumatic.—Follows wound of the lens capsule, by which the aqueous humor is admitted to the lens substance, causing swelling, opacity, and final absorption of this, and leaving only a chalk-like deposit upon the remaining capsule.

6. Secondary Cataract is so-called when it is the result of some other local disease, as glaucoma, irido-cyclitis, &c., or of some general disease, as diabetes mellitus.

Any combination of the above forms would be called a mixed cataract. The degree of hardness of a cataract depends chiefly upon the age of the patient, all cataracts occurring before the age of 35 being "soft."

Diagnosis.—Gradual failure of sight without local inflammatory symptoms is a subjective indication of cataract. A grayish appearance of the pupil is often observed in old people, which is not due to cataract, the lens being transparent. When the presence of cataract is suspected the pupil should be dilated by atropine and examined. (1) By daylight diffused rays condensed upon the pupil with a convex lens. (2) By gaslight in a similar way. These will give a white, amber-like, or brownish appearance of lens. (3) By the Ophthalmoscope, when the opacity of lens will appear as dark patches, streaks, or a central nucleus; the red choroidal reflex will only be observed inversely as the amount of opacity. In lamellar cataract, a well-defined shell of opacity appears, surrounded by a clear (cortical) layer of lens substance, through which the bright red choroidal reflex is observed. When any portion of the lens substance remains clear, note should be made as to the state of the vitreous, optic disc, retina, and choroid, with a view to probable fitness for future operation. Opacities of cornea will also appear as dark patches with ophthalmoscope, and may be seen by superficial examination. Opacities of vitreous appear as moving bodies, and are distinguished by their continuing to move after the patient's eye has suddenly come to rest.

Treatment.—In earlier stages of nucleus cataract the sight may often be improved by moderate dilatation of the pupil by atropine. Use atropine drops gr. iv. ad ℥ j. once or twice a week. Dark spectacles may be worn to favor dilatation of the pupil. In lamellar cataract patient can often see fairly well. When vision is seriously impaired and the margin of translucency is wide, make an artificial pupil by iridectomy; when the margin is narrow, perform the operation of solution, or of extraction. In forms other than lamellar, sight can be restored only by one of the following methods of operating on the lens. (1) Extraction; (2) Needle operation; (3) Suction. *Extraction.*—Various methods are in use at the present time, but all have the following common points: (1) An incision in the cornea or at the junction of the cornea and sclerotic, or in the sclerotic just beyond the cornea, sufficiently large to allow exit of lens. The incision is usually made with Von Graefe's straight knife. (2) Iridectomy is very frequently performed, either as a second stage of the operation or two or three weeks previously. This is done to lessen the danger of iritis, which more frequently follows the older operation in which iridectomy was not performed. (3) The capsule is freely ruptured by a sharp-pointed instrument introduced through the corneal wound. (4) The lens is removed through the torn capsule, either by pressure and manipulation outside the eye, or by means of a scoop passed behind the lens. The chief types of operation for extraction are: (1) *Graefe's modified linear* or *peripheral linear*—Here the incision is made with a long, narrow knife, slightly beyond the sclero-corneal junction, involving conjunctiva and forming a small arc of a circle larger than the cornea, the plane of incision forms a large angle with that of the iris. Iridectomy follows the incision. (2) The incision has nearly the same curve as the above, but is not carried so far towards sclerotic, being mostly in the cornea. Iridectomy is not usually performed here. (3) *Flap operation* (old).—Incision just within margin of cornea, and concentric with it, equal to half its circumference, and parallel to plane of iris. Beer's triangular knife. No iridectomy. Disadvantages of modified linear operation. Frequent hæmorrhage into anterior chamber. Greater risk of loss of vitreous. Risk of irritability from prolapse of iris into corners of wound, and of sympathetic ophthalmitis in the other eye. Disadvantages of the old flap operation. The large flap is liable to gape or fall forwards, causing sloughing. Frequent prolapse of iris. Frequent severe iritis. After treatment for either of these methods. Keep the patient in bed for a week. Apply a piece of soft linen to the closed eyelids, and a pad of cotton wool over this to both eyes, and secure by a four-tailed bandage. Keep the room nearly dark. Remove dressing, and gently cleanse the lids with warm water twice daily, just separating their edges to allow escape of tears that may be retained. Use one drop of atropine solution daily after the third day to prevent iritic adhesion. During the first few hours there will be some soreness, and the first dressing a little bloodstained; after this there should be no pain, and only a little mucous discharge. If doing well there will be slight congestion, but no chemosis, edges of wound united, and pupil black. Discontinue bandage after eight or ten days, and order a large shade

2. NEEDLE OPERATION FOR SOLUTION.—(1.) Dilate pupil by atropine (2.) Give anæsthetic unless the patient is old enough to control himself well. (3.) Hold lids open by stop-speculum, and use fixation forceps to steady globe. (4.) Direct a fine cataract needle to a point just within the margin of the cornea, plunge freely and obliquely through into anterior chamber, and carry point to centre of pupil. (5.) Dip point of needle back through the capsule into superficial layers of lens at centre, make a few gentle to and fro movements, so as to break up its substance, then steadily withdraw the needle. *After treatment.*—Dilate the pupil with atropine (gr. iv. ad ℥ j.) three times daily. Bandage the eye lightly, and employ dark room for several days. In case of iritis apply leeches to region of eye, and ice or evaporating lotions to lids. The result varies with the amount of the opacity of the lens. In cases of complete cataract no change will be observed for some weeks after operation In partial cataract the ruptured portion of the lens will become opaque and swollen in a few days, and in seven weeks the lens will be smaller. After six to eight weeks, if the eye be perfectly quiescent, and not otherwise, the operation may be repeated, and the needle used more freely. A third or fourth operation may be required.

3. SUCTION OPERATION.—Only applicable to soft cataract, and requires great skill in its performance, to avoid danger of iritis, or cyclitis. (1.) Dilate pupil with atropine. (2.) Make oblique opening in cornea with a broad-cutting needle between its centre and its margin, and lacerate capsule freely. (3.) Withdraw needle and pass nozzle of syringe through wound, and dip into lacerated lens substance. In lamellar cataract, and some other cases, it is necessary to allow an interval of three days between the needle operation and the suction, in order that the lens may be softened by the admission of the aqueous. (4.) Use very gentle suction, and remove if possible the whole of lens substance at one sitting. *After treatment* is the same as for needle operation (but in the case of waiting, careful watch must be made, and suction performed at once if inflammation be set up by the rapid swelling of the lens).

When to Perform Extraction.—The more complete the opacity of the lens, the more easily is it shelled out of its capsule; whilst in immature cataract some of the transparent lens substance is apt to remain, this will become opaque and may interfere with the result of operation. The signs of this "ripe" condition are:—(1.) No shadow of iris thrown upon lens within the pupillary area. (2.) No chloroidal reflex with ophthalmoscope. (3.) Patient is able to distinguish light from darkness, but is unable to count fingers when held up before the eyes. When one eye only is affected, or when one is less affected than the other, extraction should be deferred until the better eye is no longer useful, unless for special reasons. When both cataracts are mature, only one should be operated on at a time, with an interval of a few months. When there is no perception of light do not operate, as cataract alone is not sufficient to prevent this.

Occasional Results of Extraction.—1. Sloughing of cornea, very rare since flap operation was abandoned. 2. Suppurative inflammation extending from wound to the whole cornea, iris, and vitreous, variable in degree, but, when established, generally going on to suppurative panophthalmitis, or to severe plastic irido-cyclitis with corneal opacity and contraction of eyeball. 3. Iritis of a plastic nature which deposits a membrane in pupillary area. 4. Prolapse of iris into the wound either at the time of operation or afterwards.

Conditions of Sight After Operation.—Results are good when, with the aid of proper spectacles, patient can read any of Snellen's test types from No. 1 to No. 14 at 22 centimetres (8 inches), and from No. 6 to No. 24 at 6 metres (20 feet). The operation renders the eye very hypermetropic for want of the lens. Very strong convex glasses are required to compensate for its absence. Glasses should not be worn for three months after operation, and then not continuously at first. Two pairs of spectacles are needed, one pair making the eye emmetropic and giving clear vision for distant objects (about + 12 dioptres), the other pair stronger, to render the eye myopic, so that the patient is able to read, etc., at about 8 or 10 inches (about + 16 dioptres).—HENRY JULER.

CATARRH, Epidemic—*See Influenza.*

CATHETERISM—*See Urethra, Stricture of.*

CELLULITIS—*See Erysipelas.*

CELLULITIS, Pelvic—*See Pelvic Cellulitis.*

CEPHALALGIA CONTAGIOSA—*See Influenza.*

CEPHALHÆMATOMA.—A blood-extravasation. caused in childbirth. Two kinds: 1, between aponeurosis and pericranium; 2, between pericranium and skull. Former is diffuse: the latter is circumscribed and small, and never extends across a suture. Treat on general principles

CEREBRAL HERNIA—*See Head, Injuries of.*

CEREBRAL MENINGEAL HÆMORRHAGE.—*Definition.*—An extravasation of blood either between the cranium and dura mater, or into the cavity of the arachnoid, or into the sub-arachnoideal space between the arachnoid and the pia-mater, or into the tissues of the pia-mater, or between it and the brain.

Four Varieties.—Extra meningeal hæmorrhage, intra-arachnoideal hæmorrhage, sub-arachnoideal hæmorrhage, and pachi-meningitis and hæmatoma of the dura-mater.

Causes.—Age occupies the first place as a predisposing cause, it being met with most often in young infants and old persons. Other causes are, injuries of the skull, sudden rupture of a healthy artery or vein, extreme heat, venereal excesses, severe muscular efforts, excessive mental exertion, amenorrhœa, overfeeding, constipation, excessive use of alcoholic liquors, and hepatic disease.

Symptoms.—Coma appearing suddenly or preceded by headache, vertigo, and general convulsions, great enfeeblement of the mental and physical faculties; before death takes place there are vomiting, incontinence of urine and fæces, insensibility, and occasionally general convulsions.

Prognosis.—Almost invariably fatal.—WILLIAM A. HAMMOND.

CEREBRAL TYPHUS—*See Cerebro-Spinal Fever.*

CEREBRITIS—*See Brain. Inflammation of.*

CEREBRO-SPINAL ARACHNITIS—*See Cerebro-Spinal Fever.*

CEREBRO-SPINAL FEVER.—*Natural History.*—A malignant fever of sudden invasion, attended by painful contraction of the muscles of the neck and retraction of the head. In certain epidemics it has been accompanied by profuse purpuric eruption, and occasionally by secondary effusions into certain joints. Lesions of the brain, the spinal cord, and their membranes occur. The course of the disease is rapid, attended by great prostration of the powers of life, severe headache and pain along the spine. The variations of temperature are so numerous, that no typical range has yet been obtained; and the result of the fever is generally fatal.

This disease is more than simple meningitis. The whole of the nervous system is gravely implicated from the first; and some regard the disease as a variety merely of typhus fever, of influenza, or typhoid pneumonia, according to the nature of the predominating complications. The weight of evidence, however, seems at present to be in favor of considering this disease to be a substantive specific disorder, with certain symptoms, and apt to become epidemic. Premonitory symptoms are rare, but are usually slight headache with pain in the back; or uneasiness and weariness felt for several days before acute symptoms set in—the invasion of which is sudden. A chill may suddenly seize the patient, and shivering prevails, followed by intense vertigo, headache of intolerable severity, violent obstinate vomiting (cerebral), painful muscular stiffness, soon developing into tetanic contractions, particularly of the muscles of the neck and back. Distress in the head is constant, so long as consciousness lasts. The eyes express distress, the face is pale, the pupils are contracted, and the conjunctivæ red. Excessive restlessness and general muscular agitation prevail. The sensibility of surface is also so great that every touch or movement causes intense agony. These phenomena increase in severity up to the third or fourth day, when deglutition may become affected, and respiration (cerebral) irregular and imperfectly performed—the head being dragged tightly backwards to the neck, and the features fixed in the characteristic grin of lockjaw. Delirium tends to stupor, and death generally takes place by como or by apnœa from the fifth to the eighth day of the disease; otherwise the disease may continue for three or four weeks, and convalescence may be of many months' duration. The fever is generally remittent, with exacerbations expressed in sudden leaps of 1° or 1.5° Fahr., each of short duration. The highest temperatures prevail in the most rapidly fatal cases; but the maximum is generally below that of typhus, enteric, relapsing fever, and scarlatina. The pulse is not less varied than the temperature.

Diagnosis is between the disease and typhus, typhoid fever, tetanus, meningitis, influenza, and typhoid pneumonia.

Treatment.—Opium, quinine, the use of cold water and ice, have been the most useful therapeutic agents; and the principles which dictate the general management of fever and inflammation require special study in their application to this disease.—WILLIAM AITKEN.

CERVIX UTERI, Areolar Hyperplasia of.—*Definition.*—A non-malignant induration of the cervix, general or partial; commonly called induration after chronic cervicitis. It consists of a thickening and hardening of the cervical portion of the uterus by the proliferation of the connective and fibrous tissue.

Causes.—Parturition with subinvolution, consequent on too early "getting up" after delivery, puerperal metritis or cervicitis, constitutional weakness, prolapsus, excessive coitus, cold or exertion during menstruation. Coitus with sterility and its consequent tendency to hyperæmia. In virgins, flexions.

Symptoms.—Pain in the back (sacrum), with special characteristic pain through one or both hip-joints; disordered menstruation; increase of pain on exertion; dyspareunia, with occasional bleeding; languor, headache, leucorrhœa from consequent endocervicitis or granular inflammation.

Signs.—Uterus low, cervix swollen, tender, hard, and and often nodulated. If the induration is limited to the anterior lip, it will be found bulging backwards into the cervical canal, which is somewhat patent, and having the posterior lip stretched over it in a crescentic form, the concavity being of course forwards. Should the posterior lip be only affected, these conditions are reversed; the anterior and posterior lips are found, as a rule, indurated in cases of anteflexion and retroflexion respectively.

Diagnosis.—From malignant induration of the cervix by the history of case, by the mobility of the uterus, by the sensations to the touch. The feel of a cervix affected with scirrhus is somewhat like that of wet india-rubber, the hardness extending to the very surface; whereas in areolar hyperplasia the sensation is of a hardness beneath a healthy or at all events a distinguishable mucous membrane; absence of cachexia. From cervical hyperæmia by the somewhat softer condition of the latter. If the hyperplasia affects the body of the uterus, there exist as distinguishing it tympanites, nausea, dysmenorrhœa, more grave constitutional symptoms, painful mammæ; uterine sound in the uterus produces pain; bi-manual examination produces pain.

Prognosis.—Favorable.

Treatment.—This condition may be modified by general treatment, as by perchloride of mercury, ʒ j, followed by iodide of potassium, gr. 5; but a cure cannot as a rule be obtained otherwise than by local means. The three best methods of treatment are: (1) potassa caustica; (2) the actual cautery; (3) excision. Prior to the employment of either of the two former means, the hyperæmic or congested condition should be relieved by leeches applied to the cervix uteri once or oftener, as required. Puncturation is of little use, as the tissue being so hard the blood does not flow so freely as in hyperæmia when the cervix is soft. When the cervix has been relieved by the leeches, potassa caustica should be applied as follows. It would be well here to remark that the potassa caustica is to be preferred to potassa cum calce; for the latter being a milder preparation, its action is less energetic and effectual, and moreover some recommend that a piece should be packed up against the cervix, and left *in situ* for a time. This procedure is, however, not without danger, as the potassa may, in melting, trickle down on the vaginal wall, and produce a slough where it is not wanted. In using the pure potassa we see exactly the effect produced, and can stop its action at once.

(1.) The patient should be placed in the semi-prone (Sims's) position, so that the speculum, which should be as large as can be conveniently borne, may incline inwards and downwards; a piece of cotton wool soaked in vinegar, so as to neutralize any potassa that may run down, should be packed into the bottom of the speculum up to the portion of the cervix to be operated upon, and a small quantity of vinegar introduced so as to make a pond at the bottom of the speculum underneath the cervix. With Dr. Protheroe Smith's expanding speculum, a larger quantity of wool may be packed at the lower aspect of the cervix, and a larger pond of vinegar used, affording thereby greater immunity to the vagina from injury by the caustic. The potassa held in a firm porte-castique should then be rubbed over the mucous membrane, covering the indurated portion so as to completely destroy it; this is sufficient for the first operation. The speculum should be held steadily so as not to shift, and a stream of vinegar and water should be thrown up the speculum until all superfluous potassa has been completely neutralized. The loose cotton wool should then be removed, and a plug of wool soaked in vinegar should be placed against the cervix, and removed in the evening. The vagina should be syringed daily with Condy and water. In about a week the slough thus formed will be thrown off, when the potassa is to be again applied, but more freely, so as to make a deep excavation into the induration. The bottom of the excavation then usually presents the appearance of a cup eaten into a hard yellowish-white substance. In some cases where the induration is in the form of a nodule, the healthy tissue round it is seen charred black by the potassa, and the white tissue as a separate deposit in the middle. While using the potassa the distinction to the touch of the healthy and morbid tissue is quite evident. The slough from this free application is often very deep, and comes away sometimes in one piece as a tough piece of wash leather, like the finger of a glove. The contraction of the uterine tissue acting on the indurated nodule, no longer held back by any limiting mucous membrane, gradually extrudes it, and such effort of extrusion may be aided by the exhibition of ergot in doses of mxx to mxxx of the liquid extract, until that which was left as a cup-like excavation is found after a week or ten days to have been protruded into an eminence; this protrusion is to be again rubbed down freely at successive operations until it is seen that there is no more hard white tissue left, but only healthy tissue, which becomes charred by the potassa. As the treatment progresses and there is less indurated tissue to be operated on, the application of the potassa becomes more painful because of the greater sensitiveness of the healthy tissue. The chemical action of the deliquescent potassa produces considerable heat of the part destroyed, so that the syringing at the end of the operation should be with cold vinegar and water. When the destruction of the morbid tissue is complete, the part presents a deep excavation, which heals up by granulation, and does not leave any cicatrix; in fact, in cases where this treatment has been successfully carried out, the cervix presents a perfectly healthy appearance, with no trace of the work of the caustic. The process of healing may take many weeks and the patient should be carefully watched, and even for several weeks afterwards lest there should be too great contraction of the cervical canal, or even total occlusion of the os uteri. To obviate this, the uterine sound should be passed every four or five days, and subsequently every week or ten days, for about an inch up the cervical canal. This should be done with the greatest care lest inflammation should be set up, which usually takes the form of pelvis cellulitis. For the same reason the patient should be kept in bed or on a sofa, for the least exposure to cold during the use of the potassa may induce an attack of cellulitis. As the healing proceeds the parts may be touched from time to time with strong carbolic acid, which tends to make the granulations put on a more healthy appearance. Should the os uteri become by neglect of the uterine sound occluded, the best way of opening it is—taking the same precautions as before as to the neutralizing pond—to apply a pointed piece of potassa to the os uteri, and by a frequent use of the sound to keep the os patent.

(2.) When the induration is not deep, or when the cervix is more generally affected, the actual cautery proves of great service. This treatment has been advocated for a long time, more especially in France and America, but hitherto the necessity of carrying several cautery irons, and the fear their preparation excites in the mind of the patient, has prevented the general use of the actual cautery; but now that we have so portable and effective a cautery as the petroleum cautery of Dr. Paquelin, the application of the *fer rouge* will doubtless become more frequent. This apparatus enables us to carry a platinum point or button, at any heat from a gentle red to nearly white, up to the cervix uteri, and as the surface of the cautery is polished there is less radiation of heat than with the rough iron, and it does not adhere to the tissues. The same precaution has to be taken first to deplete the uterus and also to guard against cold and other sources of inflammation. The application is less painful than that of the potassa, there is no danger of any extension of the slough on to the vaginal wall, and the slough itself is not so deep. In slight cases it is sufficient to excite action by the application of a dull red heat, but in others the cautery may be heated to nearly whiteness, and a considerable portion of the indurated cervix destroyed.

(3.) In some cases where the cervix is very large and the lips everted, in order to save the time that would be necessary for the destruction of so large a mass by potassa, excision may be had recourse to. The cervix uteri should be seized with a vulsellum, and a considerable portion of the proximal surfaces of the lips of the cervix cut off with a pair of strong curved scissors; the bleeding, if profuse, arrested by the actual cautery or a plug of matico. After this operation the parts will heal by granulation, the os uteri being kept patent by the uterine sound. If the portion excised is considerable, the two flaps of the cervix may be brought together with wire sutures, care still being taken that the cervical canal is kept patent.—HEYWOOD SMITH.

CERVIX UTERI, Hypertrophy of.—*Definition.*—Elongation of the cervix not associated with morbid deposit.

Causes.—Congenital; continued exertion as by sewing machines with treadle.

Symptoms.—Backache, occasionally dysmenorrhœa from associated stricture of either os; sterility; sometimes none,

Signs—Cervix is found to be longer than normal, and conical; tendency to prolapsus.

Diagnosis.—By signs as above, and absence of history of disease of the part.

Prognosis.—Favorable.

Treatment.—Amputation.—HEYWOOD SMITH.

CERVIX UTERI, Inflammation (*Granular*) **of.**—*Definition.*—A granular condition of the mucous membrane covering one or both lips of the cervix uteri, usually associated with endocervicitis; it is more commonly but erroneously called "ulceration" of the cervix, or abrasion.

Causes.—Endocervicitis; areolar hyperplasia; endometritis; prolapsus, as subjecting the cervix to friction, excessive coitus, parturition.

Symptoms.—Profuse leucorrhœa, feeling of weakness, aching round pelvis, rendered worse on exertion; if uncomplicated, not grave.

Signs.—Surface of cervix felt to be velvety. Per speculum the cervix is seen to be more or less covered by a patch, or the os may be surrounded by a ring of red, not very course, granulations, tending to bleed, covered with a viscid glairy or puriform secretion. The granular patch is not depressed as an ulcer, but more usually is elevated.

Diagnosis.—By symptoms and signs as above.

Prognosis.—Favorable, but often tedious, depending on the cure or removal of the cause.

Treatment—If uncomplicated with areolar hyperplasia free scarification, if necessary, several times at intervals of about a week; afterwards, the application of fuming nitric acid, or pernitrate of mercury, strong carbolic acid, iodine, potassa caustica lightly; the actual cautery, Richardson's styptic colloid (tannin dissolved in collodion), chromic acid, strong solution of iron, solid nitrate of silver (?), vaginal injections of glycerine and sulphate of zinc, acetate of lead or tannin, pessaries of oxide of zinc, iodide of lead with belladonna or opium. Caustics should not be applied too frequently. If the granulations project considerably they may be removed with scissors. If the lips of the cervix are split and widely divergent (everted), the sides of the fissure may be pared, and the edges brought together with sutures.—HEYWOOD SMITH.

CERVIX UTERI, Inflammation of Mucous Membrane of—(*See Endocervicitis.*)

CERVIX UTERI, Ulceration of—*See Cervix Uteri, Inflammation (Granular) of.*

CHALAZION—*See Eyelids, Disease of.*

CHANCRE, Hard—*See Syphilis.*

CHANCRE, Soft—*See Chancroid.*

CHANCROID.—A chancroid is an ulcer or sore, generally occurring upon the genital organs of either sex, though it is sometimes met with in other parts. It is always the result of contact with matter derived from a similar sore, and usually appears within a few days (three to ten) after exposure. The ulcers are somewhat painful, and freely secrete an abundant and whitish pus or matter, which is highly contagious, and capable of producing a new chancroid, if it comes in contact with a scratch or abrasion of the skin of any part of the body, whether of the person bearing it, or of another. Chancroids vary in number, and from two to five or more are not unfrequently seen upon the same person at the same time. They may vary from the size of a pea to that of a three-cent piece. If untreated, these sores usually persist, under favorable circumstances, for one or two months before healing. If, however, dissipation be indulged in, or the organs which bear them be put to unnecessary use, chancroids usually inflame, become more painful, increase in size and are, naturally, longer in healing. If the patient at the same time be in poor health, they may become "phagedenic," that is to say, the parts surrounding them rapidly mortify, and a considerable portion of the adjoining tissues may be sacrificed.

BUBO.—During the second or third week, or even later, of the existence of a chancroid, a painful swelling in one or both groins may appear. This swelling is called a bubo, and may persist for a few weeks, producing a moderate sense of discomfort, and then gradually subside and disappear. On the other hand, it may rapidly increase in size, become exceedingly painful, and matter may form in its interior. The skin over it becomes reddened and thinned, and the bubo, unless opened by the surgeon, ultimately bursts and discharges a greater or less quantity of pus. It does not, however, immediately heal like a boil or ordinary abscess, but continues to discharge for weeks, and sometimes for months. When the hole finally closes, a very perceptible scar remains. If phagedena attacks the bubo, a great deal of additional damage may be done, and a year or more may elapse before final recovery takes place.

The bubo is the result of the conveyance of the poisonous virus by the lymphatic vessels from the original sore to the neighboring glands. It does not, however, "get into the blood" and infect the system at large, after the manner of syphilis. Consequently, when it is once cured, there is an end of the matter, and the patient is physically as well off as before, except as regards the local injury that may have been inflicted. This is, however, sometimes serious and considerable.

Treatment.—If left to itself, the chancroid will in most cases heal in one or two months, if the patient keeps it scrupulously clean and abstains from spirituous potations, sexual intercourse, etc. If, however, he is negligent in these respects, its duration is indefinite, and he runs the further risks of phagedena and increased liability to bubo. Under careful treatment, the duration of the sore may be very much abridged. The object of treatment is to destroy the virulent character of the ulcer—that is, to change it into a simple sore, with a tendency to heal. This may be accomplished in several ways. First, and most quickly, by the application of a powerful caustic, or the actual cautery, followed by the use of some simple powder or lotion. The ordinary "caustic" of the shops (nitrate of silver) is not sufficiently active, and is of little use in this connection. Treated actively, chancroids not infrequently heal in a couple of weeks or less, and the chances of bubo occurring are very much lessened.

Secondly, less active, astringent, or stimulating applications may be employed. With these the treatment may be prolonged for a month or more. The first method is decidedly the best, and the only objection to it is the temporary pain produced by the cauterization. This is quite sharp at the moment, but does not last long, and should be borne for the sake of the advantages that attend it. If a bubo appears, it will require applications of tincture of iodine, pressure or poultices, according to circumstances. If matter forms, the bubo must be opened with the knife or the pus be abstracted in some other manner, and when this becomes necessary, the sooner it is done the better. Bubo may sometimes be aborted by the free internal use of sulphide of calcium.

Under all circumstances, cleanliness and correct living are indispensable to the rapid cure of either chancroid or bubo.—HENRY G. PIFFARD.

CHARBON.—*See Malignant Pustule.*

CHARCOT'S JOINT-DISEASE.—Preceded by the "lightning pains," characteristic of tabes dorsalis or locomotor ataxy. The limb near the affected joint sometimes swells quickly and extensively, after some time returning again to its normal size. Spontaneous dislocations. Fractures caused by gentle movements. Accompanying signs of locomotor ataxy, *e. g.*, more or less inco-ordination of movements and loss of muscular sense. "The very rapid and extreme wearing away of the articular extremities of the bones is the principal character which, from an anatomico-pathological point of view, distinguishes the arthropathies of ataxia from common rheumatic arthritis (arthrite seche)." There is also little or no formation of osteophytes. Excellent model and specimen in St. Thomas's Hospital Museum.—C. B. KEETLEY.

CHEIRO-POMPHOLYX (Hutchinson).—*Definition.*—A disease of the skin characterized by the appearance of small clear vesicles or bullæ on the hands, and sometimes on the feet, usually symmetrical, running a short course, and liable to constant relapses.

Symptoms.—The disease, in its milder forms, is not very uncommon, but the more severe cases, in which large bullæ are produced, are extremely rare.

In persons of nervous temperament, when out of health or worried and depressed, the disease begins by burning and itching between and along the sides of the fingers, followed in a few hours, or on the next day, by the appearance of irregular groups of small, round, deepseated, flat-topped vesicles, containing clear serum, having no inflammatory areola around them, and resembling boiled sago grains. These vesicles usually dry up in a few days, and are followed by slight desquamation; in some more severe cases, however, they enlarge, and by their confluence produce bullæ, which vary in size from a pin's head to ¼ or ⅓ of an inch in diameter, and are scattered over the whole palm or sole. They also dry up in a few days, and the cuticle subsequently desquamates, but occasionally the bullæ burst and then desiccate, leaving red dry patches like psoriasis. The serum, at first clear, may become, if the bullæ last a few days, opalescent and slightly yellowish, but never purulent, and it always remains alkaline.

Frequently the nails are undermined and broken near the root.

Diagnosis.—The rapid and symmetrical development, the short course and tendency to spontaneous cure, the liability to recur, and its occurrence in those of nervous temperment and the worried and overworked, suffice to distinguish it from eczema.

The spontaneous cure and the absence of burrows separate it from scabies.

It differs from sudamina in the fluid being alkaline,—not, as in sweat, acid from the beginning,—a fact which is against the theory of the dependence of the disease on obstruction of the sweat ducts.

Prognosis.—The disease runs a favorable course in a few days, and is only troublesome through the itching and burning sensation it excites and from its unsightly appearance.

Treatment.—The application of lotio carbonis detergens (ʒ ij to ℥ vj), of vaseline, or of vaseline and liquor plumbi (mxxx to ℥ j), will usually relieve the itching. To combat the general nervons symptoms tonics may be given, of which iron, quinine, and nux vomica are the best, combined with change of air and rest.—MALCOLM MORRIS.

CHELOID.—*Definition.*—Keloid is a rare affection of the skin, consisting in the formation, spontaneously or in the seat of former scars, of a firm nodular tumor, composed of hypertrophied fibrous tissue, tender on pressure and sometimes attended with itching and tingling.

Symptoms.—There is no essential difference between the "spontaneous" or "true" and the so called "false" keloid, developed in cicatrices, and there is some doubt whether the "true" keloid of Alibert does not really arise in small, insignificant scars, the origin of which has been forgotten. The affection named keloid by Addison is identical with, is described under the head of, Morphœa.

Keloid grows slowly as a rounded, oval, fusiform, or nodular patch, raised one or more lines above the surface of the skin, in which it appears imbedded. Occasionally it presents the shape of a stellate or radiating, latticelike formation, and sends out processes like the claws of a crab, which gradually subside in the surrounding skin. It is firm and elastic to the touch, *has a smooth surface*, is white, or occasionally pinkish, shiny, and marked by ramifying vessels. The surface is never scaly, and the tumor has no tendency at any time to ulcerate or break down. Tenderness on pressure is usually present, and sometimes tingling, itching, or burning.

The growths occur as isolated patches, on the sternum, mammæ, sides of the trunk, or back; they may be single, but are more frequently multiple, and sometimes are met with all over the body. The cicatricial variety may develop in scars, present in any situation, but it is said to be more common in the dark races in the scars left by flogging. It usually occurs in adults. Kaposi states that new patches arise as follows:

"They consist, at the commencement, of brownish-red streaks of skin, with a pale-red or whitish lustre, of the size of oats or barleycorns, flat or already slightly elevated, communicating a sense of resistance, and are for the most part slightly painful on pressure. In the course of many months, or of years, the linear or streaky keloid increases in one or other direction, or in every superficial dimension, and thus assumes one of the characteristic shapes mentioned above, with or without processes. At the same time it will have become somewhat thicker and more elevated."

Keloid, once fully developed, remains, as a rule, unaltered for life; in only a few cases has spontaneous involution, or even complete disappearance of a single patch, been observed (Alibert and Hebra).

Clinically, keloid arising in or round about a scar is indistinguishable in its course and symptoms from the spontaneous variety.

Diagnosis.—A firm, whitish or pinkish, slightly elevated tumor in the skin, sending out clawlike processes, tender on pressure, growing slowly, and manifesting no tendency to degenerative changes, can only be a keloid or a hypertrophied scar. In course and symptoms there is no valid mark of separation between the two, and microscopic examination alone will complete the diagnosis.

Prognosis.—Keloid does not affect the general health, and causes only slight inconvenience by the tenderness and occasional tingling. When removed by operation, it almost invariably occurs, and is then larger than the previous growth.

Treatment.—Any attempt to remove the tumor by excision, caustics, or the actual cautery should be discouraged, on account of the speedy return and enlargement of the growth. The pain, if severe, should be mitigated by sub-cutaneous injection of morphia, or by an aconite ointment.—MALCOLM MORRIS.

CHEST, Injuries of.—Divided into (1) non-penetrating, (2) penetrating. Wound of the soft parts present nothing special. Rupture of the pectoral muscles sometimes takes place, as, for instance, by a falling man catching at some support in his descent. For fractures of the Ribs and Sternum, *vide* article Fractures.

CHEST, PENETRATING WOUNDS OF.—These will be noticed, according to the parts injured, under the following heads:—1, wound of pleura; 2, wound of lung; 3, hernia of lung; 4, wound of pericardium; 5 wound of heart; 6, wound of certain blood-vessels.

1. *Wound of Pleura*—Rarely occurs without wound of lung. May present all the local symptoms of wound of lung, except that any air expelled from the wound by respiration is not churned up with blood into fine froth. Such air must, of course, have entered the pleural cavity from without the chest. *Treatment.*—As for wound of lung.

2. *Wound of Lung—Signs.*—Escape of air from wound, often churned up with blood into froth; pneumothorax; hæmothorax; cough; blood and bloody froth coughed up; emphysema. *After-consequences* (both of this and the preceding injury). Pleurisy; pneumonia; hydrothorax; empyema. *Prognosis.*—Bad, but very far from hopeless. If a week passes over, hope is considerable. *Treatment.*—Perfect rest in bed on injured

side; strap chest; dress antiseptically; low diet; give iced milk; avoid stimulants, even to remove collapse. Collapse helps to stop hæmorrhage, which is the first great danger. If pulse rises, or inflammation threatens, bleed. *Vide* also Pneumothorax, Emphysema, &c.

3. *Hernia of Lung.*—Two kinds; 1, primary; 2, consecutive. Consecutive comes on when the wound has healed. Primary should be reduced so long as the lung tissue is healthy and uninjured. Consecutive can only be guarded by a shield.

4. *Wound of Pericardium.—Signs.*—1, A likely position and direction of wound; 2, those of hæmorrhage and shock; 3, those of pericarditis, viz. friction-sound, extended dulness on percussion, "thoracic oppression," dyspnœa, anxiety, &c. Pulse small and frequent. *Prognosis.*—Not absolutely hopeless. *Treatment.*—Cold locally and internally; perfect rest; venesection; digitalis and belladonna.

5. *Wound of Heart.*—When death is not instantaneous, the above remarks on wound of pericardium apply to those of heart, only the signs are more severe. Tremor of the heart and disturbance of its action are more marked. When death is instantaneous, patient either leaps up or falls down, often uttering a shriek. A patient may live for years, even with a foreign body in his heart.

6. *Wounds of Thoracic Blood-vessels.*—Those of aorta and vena cava usually at once attended by fatal hæmorrhage. Intercostal and Internal Mammary arteries. Usually recommended not to attempt ligature, but to trust to rest, cold, &c. Vanzetti's "uncipression." But. Surg. Hist. of War of Rebellion, says that these wounds demand "the rigorous application of the rules for the management of wounded arteries, the exposure of the bleeding point, and a proximal and distal ligature." In wounds of the chest, with lodgment of foreign bodies, it can rarely be advisable to make any dangerous search for them. Always consider instrument wounding, and direction of wound.

CHEST, VISCERA INJURED WITHOUT EXTERNAL WOUND.—Rare. Signs, treatment, &c., may be inferred from notes above.—C. B. KEETLEY.

CHICKEN-POX.—*Definition.*—Varicella is an acute infectious disease characterized by the production on the body of small round vesicles, appearing in successive crops. These dry up and form scabs, which fall off, sometimes leaving cicatrices.

Symptoms.—About a fortnight after the reception of the poison a crop of small roseolar papules, varying in number from a dozen or so to several hundred, appear first on the upper part of the body—usually the face,—and are scattered irregularly over the surface, but not in twos and threes, as in variola. Within a few hours the papules become vesicular, and the rash is then usually described as having at this period the appearance of having been produced by a number of small drops of scalding water thrown on the skin.

The vesicles are of small size, usually less than one-fifth of an inch in diameter, filled with clear fluid, giving them a bright, glistening appearance, and seldom have a central depression. After twenty-four hours the vesicles become slightly turbid, and at the end of two or three days are covered with scabs. Later these separate, occasionally leaving pitting of the skin. On the first day of the rash about a dozen or fifteen vesicles appear, on the second day there may be as many as 100 to 150, and successive outbreaks occur during the first four or five nights. The rash is never confluent, but occasionally two vesicles may coalesce.

The eruption is generally attended with considerable itching and some constitutional disturbance, which is never severe. The temperature rarely rises above 100° Fahrenheit. The constitutional symptoms seldom precede the rash more than a few hours, and usually occur simultaneously with it.

Diagnosis.—There is only one disease for which varicella can ever be mistaken, and that is variola. It may be well to mention that a vesicular syphilide has been occasionally mistaken for varicella, but to distinguish the two diseases it will only be necessary to point out that the syphilitic eruption rarely appears without other syphilides being present. The history and course of the two affections will serve to confirm the diagnosis.

Prognosis.—Favorable.

Treatment.—No specific treatment is required; the constitutional symptoms may be treated on general principles. The irritation of the skin is relieved by the application of oil. If suppuration occurs beneath the scab, the pus should be set free by poulticing.—MALCOLM MORRIS.

CHILBLAINS.—Inflammation of skin owing to sudden change to or from a frosty temperature. Occurs usually in females and children with feeble circulation. Congestive stage and ulcerated or broken stage. Itching. Symptoms aggravated by warmth, dietetic indulgence, and approach of evening.

Treatment.—Regular and free exercise, fresh air, healthy living, well-fitting boots, straw or cork "socks" in soles of boots. Locally, in first stage, stimulating liniments, friction with snow, painting with iodine, or solution of sulphate of copper (gr. iij to ℥ j). In broken stages, use water-dressing at first, afterwards collodium, flexible, or Peruvian balsam. Small doses of laudanum, frequently repeated, stimulate the capillary circulation.

CHILD-BED FEVER—*See Puerperal Fever.*

CHILD-CROWING—*See Laryngismus Stridulus.*

CHIN-COUGH—*See Hooping Cough.*

CHLOASMA—*See Tinea Versicolor.*

CHLOASMA UTERINUM.—This term is applied to the pigmentary deposits occurring in women suffering from uterine disease, or as a result of pregnancy. It usually appears in the form of crescentic patches on the forehead and below the hair.

CHLOROSIS.—*Definition.*—Spanæmia (?), green sickness, associated with diminished amount of red blood disks.

Causes.—The epoch of puberty, associated with disordered ovulation. Great mental anxiety or fear, deprivation of fresh air and exercise, disappointment in love, ungratified erotism, nostalgia, mental labor.

Symptoms.—Languor, aversion from society, spammenorrhœa, greenish-yellow complexion, palpitation, dyspepsia with depraved appetite, constipation, neuralgia.

Signs.—Diminution of red blood-disks, loud systolic cardiac murmur, pressure on the spine about the seventh vertical vertebra produces pain; conditions similar to the invasion of phthisis.

Diagnosis.—From phthisis by absence after long observation of confirmatory signs; from spanæmia by difficulty of cure, by color of complexion, by nervous unrest, by neuralgia, by distress in region of solar plexus.

Prognosis.—If uncomplicated, favorable, though recovery often tedious.

Treatment.—If possible, remove cause, cure the neurosis, improve general condition; change of air and scene, sea voyage, exercise in open air, sea bathing; nerve tonics, as arsenic, strychnia, quinine; continuous electric current; iron; nutritious diet.—HEYWOOD SMITH.

CHOLECYSTOTOMY.—The gall bladder has been excised by Marion Sims; result fatal. George Brown tapped the gall bladder successfully.

CHOLELITHIASIS (Gall-Stones)—*See Gall-Bladder, Diseases of.*

CHOLERA, Algide—*See Cholera, Malignant.*

CHOLERA, Asiatic—*See Cholera, Malignant.*

CHOLERA ASPHYXIA—*See Cholera, Malignant.*

CHOLERA, Blue—*See Cholera, Malignant.*

CHOLERA, English—*See Cholera, Simple.*

CHOLERA, Epidemic—*See Cholera, Malignant*

CHOLERA, European—*See Cholera, Simple.*

CHOLERA INFANTUM—*See Cholera, Simple.*

CHOLERA, Malignant.—*Natural History.*—A disease which is the result of a specific disease-poison, which reproduces and multiplies itself during the course of the malady. It propagates by contagia given off mainly, if not only, by the stools, in which the poison multiplies even after their discharge; so that the stools become more virulent after they are passed, especially when mixed with water. The disease commences in many cases by premonitory diarrhœa, attended by sudden muscular debility, tremors, vertigo, and occasional nausea. Spasmodic griping pains pervade the bowels, with depression of the powers of respiration and circulation, and a sense of faintness and oppression in the præcordial region. A copious purging of serous fluid, like water in which rice has been washed, of alkaline reaction, and sometimes containing blood, is generally accompanied by vomiting and burning heat at the stomach, coldness and dampness of the whole surface of the body, lividity of lips, cold breath, an unquenchable thirst, a feeble, rapid pulse, difficult and oppressed respiration, with extreme restlessness, suppressed urine secretion, blueness of the whole body, a sunken and appalling countenance, a peculiarly suppressed voice, ending in fatal collapse, or in reaction and secondary fever.

This disease is also known by the name of serous cholera, spasmodic cholera, and Asiatic cholera. It exists at all seasons of the year among human beings inhabiting certain parts of India, which are regarded as the natural perennial or endemic area of the disease. Thence it is capable of being disseminated or propagated over the surface of the earth, through the atmosphere or in other ways, but chiefly by means of human intercourse between the healthy and the sick. Under certain favorable conditions, malignant cholera becomes epidemic alike in India and other regions of Asia, in Europe and America.

For a detailed statement of the several theories regarding the origin and occurrence of this disease, the reader is referred to my larger Text-book.

It may be here stated, generally, that all the theories regarding cholera agree—(1.) in its being due to a specific poison; and (2.) in assigning an Eastern origin to this poison, which comes into existence among the hot, moist vapors of the wet, undrained, uncultivated deltas of the large rivers passing through the plains of Central India. Nearly all the theories also acknowledge the existence of certain meteorological and local conditions, or a predisposition in the inhabitants of infected districts as usually necessary to facilitate the spread, and give force and vitality to the poison.

The disease does not seem to be contagious in the sense in which small-pox and typhus fever are contagious. But all matters which the patient discharges from the stomach and bowels are infective, and become more infective by certain putrefactive processes. They are capable of setting up similar infective properties in other excremental matter with which they may come in contact. Hence, if they find access to drinking water in wells or reservoirs of water, large volumes of water may be thus contaminated by small quantities of the specific infective and putrescent material.

Regarding the details of morbid anatomy and condition of the blood seen in fatal cases of cholera, the reader must consult the larger Text-book. The subject is of importance as to the various views held regarding the treatment of the disease. Certain chemical changes are also undergone by the body during the progress of cholera, which also have an important bearing on the details of therapeutics.

The disease has many degrees of severity, and cases generally pass through three stages, namely—the premonitory diarrhœal stage, the cold, pulseless, or asphyxiate stage, and, thirdly, the febrile stage, if the other stages are outlived. The duration of the premonitory and cold stages varies from a few minutes to twelve, twenty-four, forty-eight, or more hours. The febrile stage lasts from four to eight, or more days.

The attack is commonly sudden—after a period of incubation, variously fixed at from thirty-six to sixty hours up to three to fourteen days.

In this country diarrhœa generally precedes the marked symptoms by two or three days, in the slighter form of the disease; but all such cases of severe diarrhœa, during an epidemic of cholera, ought to be regarded practically as cases of cholera. The diarrhœa is all the more dangerous because it is painless.

Another, and worse variety of the disease, is seen in those cases in which, after two or three stools, severe and long-continued cramps come on, accompanied and followed by intense algide symptoms.

In the worst cases a mortal coldness comes on from the beginning.

The symptoms of the second or febrile stage, are those (1.) of reaction, passing into (2.) a form of fever not dissimilar to that known as enteric or typhoid fever. This second stage is more usual in Europe and America, and nearly unknown in India.

The following series of phenomena are to be distinguished in typical cases of cholera in this country:

(1.) Fæcal premonitary diarrhœa, passing into (2.) choleraic diarrhœa and vomiting, with rapid sinking of temperature, leading to (3.) asphyxia or collapse, when the lowest temperature is reached. (4.) Reaction, passing into (5.) a torpid stage, or secondary algide period, in which, although reaction has been established, the temperature still remains below the normal limits, and then gradually or suddenly rises to the normal average. (6.) A tepid stage, when the temperature rises to normal or above, and passes to (7.) the fully-established secondary fever of typhoid type. The duration of the cholera process is from twenty to thirty hours.

The conditions which complicate the cases of the patients who survive the first and second stages are mainly consecutive fevers, gastritis, with vomiting, acute desquamation, nephritis, with anæmia; enteritis, with diphtheritic exudation extending especially upwards through the small bowel from the ileo-cælic valve; dysentery, pneumonia, pleurisy.

Diagnosis is mainly concerned with distinguishing true malignant cholera from simple cholera, or diarrhœa due to causes different from the cholera-poison. During an epidemic all cases of diarrhœa should be looked upon with suspicion, regarded as serious, and treated as if they might turn out to be cholera.

Treatment.—Three periods are to be provided for—(1.) The period of diarrhœa; (2.) the algide period, or period of collapse; (3.) the period of reaction.

To check or arrest the diarrhœa is the practical result aimed at by a variety of formulæ of remedies, and those in which opium is the main remedy have obtained the greatest amount of confidence. It is not to be given if any signs of collapse exist; but if the evacuations are still fæcal, a full dose ought to be given. Stimulants are called for during the stage of collapse, and as soon as any flagging of the pulse is observed, brandy in iced water and champagne should be given in small quantities, as frequently repeated as the condition of the pulse dictates. Subcutaneous injection by solution of camphor and of ammonia have also been of service. Cold compresses over the abdomen are also of service in collapse. Water, pure and cold, may be allowed freely, and still more freely when reaction sets in—when food of the blandest kind and most liquid form should be given in regulated quantities. Much is yet to be hoped for, in the way of prevention, through improvement of the sanitary condition of India, especially in those localities within the endemic area of the disease.—WM. AITKEN.

CHOLERA MORBUS,
CHOLERA, Serous. } *See Cholera, Malignant.*

CHOLERA, Simple.—*Natural History.*—This disease is usually the result of some irritant, as from unwholesome food, drink, or poison, or cold, and takes the form of an acute catarrhal inflammation of the mucous membrane of the stomach, which extends into the intestines, attended with nausea, retching and vomiting, followed by severe watery diarrhœa, consisting of profuse transudation of fluid containing little albumen; the whole system generally is affected. This disease is apt to become epidemic in summer, towards its close, or in the beginning of autumn. The attack is often abrupt, as by a sudden seizure during the night. If during the day, nausea may exist with occasional pains of colic. Vomiting commences and nausea increases. Much movement takes place in the intestines, and stools follow. Vomiting and purging, once commenced, recur in rapid succession, sometimes almost simultaneously; and enormous quantities of food are evacuated. Intense thirst results, and spasm and cramps may also occur.

Treatment.—After the stomach has completely discharged its contents—as it is sure to do—opium in solution, with chloroform mixture, is the kind of remedy most to be relied on; and when repeated, or aided by enemata containing opium, the effects of repetition of the drug must be carefully attended to.—WM. AITKEN.

CHOLERA, Spasmodic.—*See Cholera, Malignant.*

CHOLERA, Sporadic.—
CHOLERA, Summer.— } *See Cholera, Simple.*

CHOLESTEATOMA (Sebaceous Tumor.)—*See Tumors, Cystic.*

CHOREA.—*Etiology and Pathology.*—Many views have been advanced as to the nature of the complaint named chorea, but it will not serve any practical purpose to allude to them all in this work.

No morbid appearances have yet been acknowledged as characteristic of chorea. In a valuable communication read before the Medico-Chirurgical Society by Dr. Dickinson, the morbid appearances observed in several fatal cases were described as widely-spread symmetrical hyperæmia and its consequences, affecting the nervous centres, but especially the ganglia at the base of the brain and the spinal cord, particularly the upper part of the latter, and the posterior and lateral portions of its gray matter. The hyperæmia was most marked in the arteries, and its effects became apparent according to the duration of the disease, viz.: hæmorrhages, periarterial exudations and degenerations, and spots of sclerosis in chronic cases. To this increased vascularity and its consequences Dr. Dickinson would attribute the phenomena of chorea, localizing the disturbance chiefly in the spinal chord. He considers it as mainly produced by causes belonging to two classes, viz.: the rheumatic condition, and various kinds of irritation, mental and reflex, in connection with the nervous system. He regards the lesions as points of irritation, calculated to excite nervous functions unduly, and thus to lead to muscular excitement. .

A theory which was first started by Kirkes, and which is supported by Hughlings Jackson, Broadbent, and others, attributes chorea to minute emboli, which are conveyed from deposits on the valves of the heart, and become lodged in the small vessels of the convolutions near the corpora striata and optic thalami, or in these centres themselves, and other neighboring parts of the brain. Broadbent localizes the mischief in the corpora striata; Jackson in the adjoining convolutions. Bastian regards the plugs as being of the nature of thrombi, which are formed of accumulations of white corpuscles. As a consequence impaired nutrition of the affected nerve-centres results, leading to disturbance, but not to complete abolition of their functions. The embolic theory is believed especially to apply to those cases in which chorea accompanies acute rheumatism. When this disease attacks yonng persons choreic symptoms are very liable to arise. Occasionally signs of endocarditis or pericarditis occur along with chorea, and also a high temperature, but no joint symptoms. It is highly probable, however, that the derangement of the vascular supply and of the nutrition of the nerve-ganglia which leads to chorea, may result from other causes beside embolism, such as slight local disease or hæmorrhage, disease of the vessels, mental shock, reflex irritation conveyed from some distant part, or an impure state of the blood. Some writers have maintained that chorea is due to a certain definite change in the blood, and that the complaint is allied to the acute specific diseases. In many cases anæmia is observed. Apart from rheumatic fever, by far the most frequent exciting cause of chorea is a sudden fright, especially when acting on a child previously weak and anæmic. The complaint may, however, arise from other forms of emotional disturbance, or from imitation, when children associate with others who are suffering from chorea; from injury to the head or to some local nerve; reflex irritation connected with worms; painful second dentition; masturbation; menstrual derangements; or pregnancy. Frequently no obvious cause can be made out except the condition of the blood and of the general system.

There are some important predisposing causes of chorea, viz.: the female sex; early age, especially from 5 to 15; hereditary tendency to various neuroses; bad living and unfavorable hygienic conditions, with consequent imperfect nutrition; a recent attack of some acute lowering illness; and a damp and cold climate or season. Anomalous choreiform movements may occur at any period of life, in connection with various organic cerebral diseases. Certain movements observed in children, and also in adults, are merely the result of a bad habit, such as frequent closure of the eyelids or twitching of the mouth.

Sumptoms.—Chorea is characterized by peculiar persistent involuntary movements of various muscles, partaking of the character of clonic spasms, with loss of control over voluntary actions; the will appearing to have its influence over the muscles diminished, while co-ordinating power is impaired. The complaint generally runs a definite course, though of variable duration, the symptoms setting in gradually, reaching their height in about two or three weeks, at which they remain for a variable time, and then subsiding. Sometimes, however, chorea remains as a chronic condition. The first signs which attract notice are that the patient seems restless and fidgety, cannot keep quiet, jerks one of the limbs about occasionally, halts or drags one of his legs in walking, makes grimaces, performs various acts awkwardly, or drops and breaks things. The phenomena of the established disease are very characteristic. The term "insanity of the muscles" has been well applied to the absurd, disorderly, involuntary movements which are observed. As a rule they are moderate in intensity, and not painful; they exhibit great variety in combination, being not mere jerks of the muscles, but more like restless movements, indicating complex co-ordinations, and often conveying an idea of purpose or design. The head is moved about *in various directions*; the face exhibits all sorts of *ridiculous smiles, frowns, and grimaces*; the tongue is often thrust out and coiled, and then withdrawn again, or pushed into the cheek, or drawn into the throat, as if an attempt were being made to swallow it. The shoulders are jerked up, and the arms thrown about, while various fidgety movements are carried on with the hands and fingers. The legs are frequently unaffected, being in all cases much less disturbed than the arms. Respiratory movements are infrequent, jerky, and irregular, the natural relations of the abdominal and thoracic movements being perverted during breathing; sometimes there is a dry nervous cough or grunting sound. It does not often happen that the muscles of the trunk seem to be much affected, but choreic patients are usually unable to sit or lie quietly for any length of time. The muscles of the larynx are rarely implicated, those of the pharynx never. Very commonly these involuntary movements commence and are more marked on one side than the other, or they may be entirely unilateral—hemichorea, or even confined to one limb. They are much intensified by attention being directed to them, as well as under the influence of emotion. A strong effort of the will or a deep inspiration may temporarily control them, but they became worse afterwards. During sleep they cease, but may be excited under the influence of dreams.

The want of control over the voluntary movements is seen in every act which the patient performs, such as walking, holding out the hand, putting anything to the mouth, eating or drinking, smiling, attempting to take hold of or to carry any object, which is generally allowed to fall or is thrown down. Articulation is commonly indistinct and jerky. Micturition may be difficult on account of the jerking of certain muscles. The sphincters are never affected. The muscles are in a state of decided weakness, amounting to slight paralysis. A sense of fatigue and nervous exhaustion is usually experienced, while aching in the limbs, headache, and pain in the back are often complained of. The expression seems to point to some degree of mental defect, but this is mainly due to the movements of the muscles of the face, though in many cases, especially if the disease is of long duration, the intellectual faculties become somewhat obscured.

The general health is almost always below par, anæmia being often a prominent feature in cases of chorea. Temperature is normal unless the disease is associated with some pyrexial condition. The digestive organs are out of order in many cases. The urine is usually concentrated at first, contains excess of urea, and frequently deposits urates abundantly, as well as oxalates and phosphates sometimes. The state of the heart requires special consideration. In all cases of chorea it is desirable to examine this organ every day, if practicable. A basic anæmic murmur may be heard, but it is a mitral regurgitant murmur, which must be specially looked for. This may be inorganic, resulting from irregular muscular action; or organic, associated with valvular lesion. The former is distinguished by its being usually not very loud or harsh, though it may be very well marked, frequently by its irregularity, being heard at one time and not at another, and by its disappearance as the patient improves. An organic murmur is in many instances evidently connected with an attack of rheumatic endocarditis, but it is important that this may be set up in cases where there is no obvious implication of the joints. Dr. Dickinson has advanced the opinion that endocarditis may be the consequence of chorea, being brought about by the irregular action of the heart.

Cases of chorea are occasionally met with in which the symptoms present an extremely acute and aggravated character, the spasmodic movements being excessively violent and constant, and extending throughout the body. The patient is unable to swallow or to perform any voluntary act; and becomes greatly distressed and exhausted, sleep being rendered impossible. Death ensues if the movements do not abate, often preceded by adynamic symptoms, delirium, or coma, but the intellect may be clear almost to the last. Two such fatal cases, occurring in girls about the period of puberty, have come under my notice, and similar attacks have been observed in connection with parturition.

Diagnosis—The symptoms of well-marked chorea are so characteristic that it is scarcely possible to make a mistake in diagnosis, and therefore no special remarks need be made on this subject.

Prognosis.—Chorea almost always terminates in recovery, except when it assumes the severe form alluded to above. No definite opinion as to duration should be given. The circumstances favorable to a speedy recovery are that the disease is due to some condition which is amenable to treatment, that this is commenced at an early period, and that the patient can be placed under proper sanitary conditions. The danger of the development of the cardiac complication should always be borne in mind. Chorea greatly increases the danger from acute rheumatism.

Treatment.—It is difficult to estimate the value of remedies in the treatment of chorea, as the complaint so often tends towards spontaneous cure. The indications which should be primarily attended to are: 1. To get rid of any obvious cause of reflex disturbance. 2. To regulate carefully the diet and the state of the digestive organs, especially maintaining a free action of the bowels. 3. To improve the general health and quality of the blood by nutritious food; proper hygienic conditions; change of air; cold or tepid bathing, or the douche, especially applied over the back, with friction afterwards; and the administration of some preparation of iron, particularly if the patient is anæmic. Many cases do remarkably well under the use of ferruginous preparations, especially the sequioxide, tincture of sesquichloride, ammonia-citrate, or carbonate. A great many supposed specifics have been introduced for the cure of chorea, the chief of these including salts of zinc, liquor arsenicalis, tincture of belladonna, conium juice, hydrate of chloral, tincture of cannabis indica, hypophosphites, calabar bean in the form of powder, extract, or tincture, a combination of morphia with strychnia, and chloroform by inhalation twice or thrice daily. From personal experience I do not think that any one of these remedies is applicable for all cases, but one or other of them may be found of service in different instances. The application of ice to the spine, the passage of a slight constant galvanic current along this region, and subcutaneous injection of curare are among other special modes of treatment which have been advocated. The movements may often be diminished by proper discipline, and are greatly improved by gymnastic exercises. When the disease comes under treatment in its very early stage, some practitioners believe that they can check its course by exciting a free action of the skin by means of warm or hot-air baths, followed by saline medicines, or by small doses of tartar emetic. Others employ emetics at the outset. Should sleep be much disturbed, some narcotic must be given. If the movements are very severe, it will be well to let the patient sleep on an air-bed or water-bed. Chorea complicating acute rheumatism usually needs no special treatment. Those dangerous cases in which the movements are extremely violent are but little amenable to any treatment. Inhalation of chloroform, subcutaneous injection of morphia, or, perhaps, of curare, and supporting the patient, enemata being employed if necessary, seem to me the most reliable measures to be adopted in such cases.—FREDERICK T. ROBERTS.

CHOROID.—Diseases.—1, Hyperæmia; 2, Choroiditis; 3, Sclerotico-choroiditis posterior; 4, Tubercle; 5, Tumors; 6, Bone formation; 7, Coloboma; 8, Rupture.

Choroiditis may be (1) Syphilitic, (2) Simple, (3) Suppurative.

SYPHILITIC CHOROIDITIS *is the most common.* It is characterized by the *presence of numerous distinct patches* scattered about fundus, but most abundant towards periphery; they are at first of a yellowish red appearance, which soon changes to yellowish white or glistening white, according to the extent of choroidal atrophy. The patches are more or less pigmented. Vision is affected in proportion to the extent of the disease. Usually no pain. Generally a history of acquired or inherited syphilis. *Treatment.*—Mercury combined with iodide of potassium. Rest of eyes by means of dark room. Artificial leech or dry cupping to temples. In the early stage mercury does great good, and in old cases where failure of sight is increasing it should be given. *Prognosis*, guarded.

SIMPLE CHOROIDITIS.—In this form the patches of atrophy are similarly distributed but are confluent (compare with syphilitic form). Or, large areas of incomplete atrophy are interspersed with separate patches, or there may be a wide-spread superficial atrophy with pigmentation. The field of vision is here also affected in proportion to the change.

SUPPURATIVE CHOROIDITIS is acute, and occurs in conjunction with similar inflammation of neighboring parts (panophthalmitis).

SCLEROTICO-CHOROIDITIS POSTERIOR is limited to the regions of the optic disc and yellow spot, which present many varieties of localized change. It is common in myopic eyes, and the appearances thus produced are known as "posterior staphyloma," " myopic crescent," etc.

TUBERCLE OF CHOROID appears in the form of small circular, circumscribed spots (0.3 to 2.5 mm.) situated chiefly in the region of optic disc.

TUMORS.—1, Sarcoma; 2, Carcinoma.

BONE FORMATION sometimes occurs on the inner surface of choroid of eyes which have been long destroyed; it varies in thickness from a mere film to a dense osseous cup.

RUPTURE OF CHOROID may occur from a blow on the globe and may exist with or without rupture of other coats. Hæmorrhage at once occurs, and blood may be effused (1) between choroid and retina; (2) between choroid and sclerotic; (3) into vitreous.—HENRY JULER.

CHOROIDITIS—*See Choroid, Diseases of.*

CHOROMIDROSIS.—*Definition.*—A very rare condition in which the sweat is said to be colored.

CHRONIC GOUT—*Natural History.*—The nature of chronic gout does not differ from acute gout, except as regards its chronicity. This chronicity is shown by the frequency of the attacks of gout, and by other persistent and permanent signs of the gouty constitution. The dyspepsia is especially persistent; and although distinct paroxysms are accompanied by less pain and fever than in acute gout, they last for weeks or months, and several joints are affected at once, or in rapid succession. The chalky deposits, described as a characteristic lesion, in and about the joints, are most common in cases of chronic gout. The swelling and redness of the part develop very slowly. The redness is generally less intense, and the swelling more diffuse and œdematous than in acute gout, and it does not subside with the desquamation of the cuticle. After repeated attacks, the volume of the part grows by new deposits, and may eventually attain a considerable size; and the continued irritation of these deposits causes pain, difficulty of motion, and great deformity of the parts implicated. Phlegmonous inflammation is common; abscesses sometimes occur about the joint, and the pus contains masses like soft mortar, from the breaking up of these chalky concretions.

Observations on body-temperature are wanting alike in gout and in chronic gout. The febrile phenomena may be characteristic. Chronic gout may persist at intervals for fifty years; and in some cases the paroxysms become so frequent and irregular, as rarely to be ever absent, and only a month or two in summer may elapse between the attacks.

A fit of chronic or "inveterate gout" commences, as Sydenham observes, especially in the morning, when the ligaments of the bones of the metatarsus are violently stretched, and seem to be squeezed with great force, as if with a strong hand, generally after yawning. And sometimes, though no yawning has preceded, when the patient has disposed himself to sleep, he feels a blow on a sudden, as if the metatarsus were being broken in pieces by a large stick, so that he wakes crying out with pain. The tendons of the muscles of the tibiæ are sometimes seized with so sharp and violent a convulsion or cramp, that if the pain it occasions were to last only a short time it could not be borne with patience.

The succeeding paroxysms, after many racking pains, become less painful, when, "instead of the usual external pain, a certain sickness, a pain in the belly, a spontaneous lassitude, and sometimes a tendency to diarrhœa succeed."

Another form of chronic gout is known as atonic gout, when the joints enlarge, and the tissues and ligaments become thickened and the seat of various effusion, so as often to distend and even to dislocate the bones; and yet, if the patient be kept quiet, he experiences no pain. The patient suffers from loss of appetite, indigestion, sickness, nausea, flatulence, acid eructations, pains in the stomach, cramps in the legs, and in various parts of the body; also great dejection of spirits, vertigo, palpitation, fainting, asthma, and also, perhaps, from stone or gravel. The most insignificant causes, such as errors of diet, excitement, exposure to cold, changes of weather, and the like, will bring about these general constitutional symptoms, accompanied sometimes with pains in one or more joints, resembling commencing attacks of gout.

In the course of this disease there may be a metastasis to the stomach or other part, and the affection is then termed "retrocedent gout," the pain in the joints being trifling, or having entirely subsided. The term is "applied to cases of gout in which some internal organ becomes affected on the disappearance of the disease from the joints, and is referable either to acute or chronic gout." The organs most frequently affected are the stomach, intestines, brain and heart, when the symptoms may be either of a spasmodic or inflammatory character. The spasmodic is the most frequent.

Gout affecting the encephalon may sometimes present the phenomena of an apoplectic seizure, or be indicated by severe circumscribed headache, giddiness and vomiting.

Gout affecting the heart may induce irregular and feeble action of that organ, associated with disturbed circulation, dyspnœa and fainting.

Gout affecting the spinal canal may induce sudden paraplegia.

It is only when gout runs its course with unusual symptoms, when the patient suffering from gouty inflammation of the joints suddenly is attacked in some of these inward parts, especially when the gouty affection of the joint is subsiding or developing, or terminating by copious excretions of urates by the kidneys, that we are warranted in considering such attacks as "retrocedent gout."

Besides being thus a migratory disease from part to part, gout often alternates with other chronic diseases, such as asthma and rheumatism, and may co-exist with them.

Treatment.—In chronic gout the treatment is the same as in acute gout; but as, next to hereditary predisposition, a disproportion between the amount of food and drink taken and the necessity for it is a great cause of the disease, means ought to be taken to regulate the diet and promote metamorphosis of tissue during intervals of freedom from gouty paroxysms. The habits of the patient ought to be regulated by written rules for him to abide by, if he would be free from gout. The form, the quantity, and the quality of the food ought to be precisely prescribed. Vegetables, with soups and meat, must be allowed only once a day—not oftener. Beer, wine, and alcoholic fluids generally, as they retard the metamorphosis of tissue, are injurious, and must be forbidden to gouty patients. The same is true of tea and coffee. Water, pure water only, taken in quantities as large as possible, promotes the metamorphosis of tissue to a greater extent than any remedies we know of. Its use does not lessen appetite for food—as is the case with beer, wine, spirits, tea, and coffee. It promotes the flow of fluid by the kidneys,and increases the excretion of urea. Combined with muscular exercise, the use of pure water hastens, to the greatest possible extent, the transformation of tissue; and, combined with the use of certain mineral waters and baths, " a connecting link," as Niemeyer writes, is established between the dietetic and medicinal treatment of gout.

The mineral springs which exercise the most favorable influence on the gouty constitution are those of Aix in Savoy, Bath, and Buxton, Ems, Gastien, Homburg, Karlsbad, Kissengen, Marienbad, Neuenahr, Pfaffers, Pyrmont, Schwalbach, and Spa, Toplitz, Wiesbaden, Wildbad, and Vichy. The particular mineral water must be selected according to the nature of the individual case; for the robust and those of full habit, the alkaline saline springs should be chosen; when torpidity of the bowels predominates, the purgative waters should be used; when the skin is inactive, the sulphur springs may be used; and when much debility prevails, or an atonic state exists,then the more simple thermal springs may be prescribed. The beneficial influence of these natural mineral waters is especially perceptible in the reduction of plethora, and in the regulation of the functions of the bowels and skin. Their use should be prohibited when there is much structural disease in any important organ, especially in the heart or kidneys; and even when organic mischief is slight, the greatest caution in their use is necessary. They are to be avoided when an acute attack is either present or threatening.

GOUTY SYNOVITIS.—*Natural History.*—In chronic forms of gout the local affection of a joint may predominate over the constitutional disease, and when repeated attacks of gout affect a joint, during the course of which the inflammation is invariably accompanied by the deposition of the salts peculiar to gout, the joint at last loses its capacity for movement. Such is gouty synovitis. In place of the normal products of inflammation in the synovial structures of a healthy subject, the synovial fluid is thickened by the chalky-like material, and the synovial membrane is studded with the small white masses of urate of soda. The synovial membrane becomes thickened and vascular; the ligaments and areolar tissue become condensed, and serious lesion of the joint is apt to be the final result. It is permanently injured, either by becoming so rigid that its functions are practically destroyed, or from the formation of the chalk concretions or *tophi*, which destroy the joint-structures. It is the existence of these chalky deposits—the special characteristic of the gouty affection—which distinguishes gouty synovitis from the chronic osteo-arthritis about to be described.

Treatment.—The principles of management do not differ from those to be followed out in chronic gout. The diet must be carefully regulated, and the dyspepsia relieved. The secretions, urinary and intestinal, must be regulated.

CHRONIC OSTEO-ARTHRITIS.—*Natural History.*—By some this affection has been regarded as a form of chronic articular rheumatism; others regard it as essentially different; and although the College of Physicians have retained a synonym to indicate the connection of the disease with rheumatism, they have placed the affection after gout, and not after rheumatism. It seems also to have been one of the numerous affections comprehended under the name of rheumatic gout—a term which has been advantageously omitted in the nomenclature of the College of Physicians.

This disease is characterized by pain, stiffness, and deformity of one or more of the joints, associated with the deposition of new bone round them. It may attack any joint indiscriminately, when it becomes so swollen and misshapen that the term "arthritis deformans" has also been given to the disease. The articular inflammation generally commences with the synovial membrane. It not only affects the synovial capsule and ligaments, but the cartilages and ends of the bones become involved in lesions which are characteristic of the disease. The articular cartilages and surface of the bone eventually disappear, an induration of the central parts of the joint succeeds, followed by an extensive proliferation of new bone (osteophytes), which grows round the peripheral portion of the joint ends of the bones, giving them a very ragged appearance. The ends of the bones are in immediate contact by smooth articular surfaces, without any intervening cartilage.

The disease develops very slowly—most commonly between the twentieth and fortieth years of life; but it may begin late in life, and even in advanced age. Pain is increased on pressure and on movement of the joint; and if the hand be laid on the joint when it is moved, a crackling or crepitation may be felt, the joint being almost dry, or containing a very small amount of synovia. The disease generally begins in both hands, and passes to the feet, and great deformity takes place from subluxation of joints, enlargement of the epiphysal ends of the bones, and destruction of the articular cartilages. The fingers ultimately are flexed on the metacarpal bones, and drawn over seriatim to the ulnar side of the palm, so that the fingers lie over each other. These characteristic enlargements of the joints acquired for the disease originally the name of nodosity of the joints, affecting chiefly the hands and feet; and more recently this is the form and site of the disease to which the term rheumatic gout has been most commonly applied. When the larger joints were implicated in a similar morbid process, the disease was then generally considered to be chronic rheumatism; and when seated in the hip-joint, as is usually the case in old people, the disease was described under the name of "morbus coxæ senilis." Now the name placed at the head of this subject is the official name, which is meant to comprehend all these forms of the disease.

It sometimes succeeds chronic rheumatism, when, as a rule, many joints are affected, and the disease is no doubt influenced by the constitutional diäthesis of rheumatism; and as there is a great resemblance to rheumatism in this disease, details of differences are to be found in the table on the following page.

Treatment.—Chronic osteo-arthritis must not be treated either as gout or as rheumatism. Colchicum is generally injurious, and so also is alkaline treatment. The action of the skin is to be encouraged by hot-air baths, the frequent use of the Turkish bath, and by Dover's powders at bedtime. Warm bathing gives relief, and the mineral springs of high temperature, warm clothing, and residence in a warm climate during winter months, contribute greatly to comfort. The diet must be nutritious and easily digested, and some form of alcoholic stimulant is generally required. By way of medicine, the guaiacum electuary is most beneficial in regulating the bowels; while iron, quinine, and cod-liver oil are required as tonics.

THE DIFTERENTIAL DIAGNOSIS OF GOUT, RHEUMATISM, AND CHRONIC OSTEO-ARTHRITIS (Dr. Garrod).

GOUT.	RHEUMATISM.	CHRONIC OSTEO-ARTHRITIS.
Strongly Hereditary.	Less so than gout.	Less so than gout, if at all.
Much more frequent in males and the better classes.	As frequent in females.	More frequent in females, and among poor and ill-fed.
Seldom occurs before puberty, generally much later— 30 to 35.	More frequent in young, and before middle age—16 to 20.	Occurs both in young and old—usually 30 to 40.
Induced by high living, over-feeding, wine and malt liquors, preceded by indigestion.	Occurs in the weak, and not caused by wine, &c.; excited by cold and damp.	Often induced by depressing causes, and sometimes excited by cold. Preceded by exhaustion and debility.
The smaller joints particularly affected in early attacks, and especially great toe.	Large joints more affected than small, usually several in number.	Large and small joints about equally affected.
Local symptoms intense, shining surface and enlarged veins. Permanent enlargement after a time, with deformity and deposit of urates.	Symptoms less severe than gout. No enlarged veins, no desquamation.	Symptoms not severe, but long-continued; deformity, without deposit of urates.
Great pain, œdema, and desquamation of cuticle.	Pain less intense; seldom œdema.	Less pain, much swelling, and often some œdema.
Does not induce acute inflammation of the structures of the heart, but nervous depression of heart's action; may also affect stomach, brain or kidneys.	Often can acute pericarditis and endocarditis, and sometimes pneumonia.	No tendency to cause heart disease.
Febrile disturbance moderate.	Febrile disturbance great; more than from local inflammation.	Little febrile disturbance, but gradually progresses in severity.
Paroxysms periodic in early attacks.	Attacks not periodic.	No periodicity.
Early attack lasting but a week or ten days.	Attacks generally much longer.	Duration of attacks indefinite.
Blood rich in uric acid.	No uric acid in blood.	No uric acid in blood.
Constant deposit of urate of soda in inflamed cartilages and ligaments and external ear.	No deposit of urate of soda.	No deposit of urate of soda; ulceration of cartilages of joint.
Often leads to kidney disease.	No tendency to cause kidney disease.	No tendency to induce kidney disease.
Often produces chalk-stones externally.	Never causes chalk-stones.	No chalk-stones produced but swelling of joints.

WM. AITKEN.

CHRONIC RHEUMATISM.—*Natural History.* This is one of the most common forms of rheumatic disease. The knee, ankle, hip, elbow, or shoulder joint are those which usually suffer from chronic pain, stiffness, and swelling. The soreness, stiffness, and pain generally extend from the joint, along the fibrous structures, to a greater or less extent, the whole limb thus becoming the seat of severe pain. Commencing generally in the aponeurotic expansions of these large joints, the affection is apt to pass to the periosteum, and to induce there and in the interior of the joints such a chronic morbid action as in some cases occasions the removal of the synovial membrane and cartilages, while a procelain-like substance comes to supply the place of the cartilage, having a polished surface, without any elasticity of cartilage, and destitute of secreting power, from being destitute of synovial structures. It is especially prone to attack those joints or places which had previously been the seats of dislocation, contusion, or other severe injury. The affected textures all become finally thickened, they lose their flexibility, becoming impaired in tone and in vital cohesion.

Prolonged and repeated attacks of chronic rheumatism chiefly affect and lead to deformity of the hip-joint, and generally all the large joints. It is most common after thirty years of age; and is especially frequent among the laboring poor, and among soldiers and sailors, who are exposed to the changes of season and weather—to cold and wet. The symptoms are always aggravated at night, and by vicissitudes of weather, especially the prevalence of east winds, humid and cold states of the atmosphere, and the disease is mostly associated with derangement of the digestive organs.

The joints of the hands are often also liable to be affected. Those of the fingers are generally most deformed, the joints being liable, in extreme cases, to dislocation.

The treatment of chronic rheumatism does not differ in its general details from that of acute rheumatism. Decoction of cinchona, preparations of guaiacum, with alkalies and colchicum, are the best remedies after the action of such searching evacuants as calomel and jalap have removed morbid accumulations, and improved intestinal secretions. The various forms of the so-called "Chelsea Pensioner," comprising guaiacum and sulphur, are of great service taken in the form of an electuary. Iodide of potassium is also of great benefit in the arthritic forms of chronic rheumatism, combined or not with preparations of aconite and colchicum. Warmth of flannel and the warmth of bed with ree perspiration, generally tend to mitigate and shorten the severity of the paroxysms. The Turkish bath is also of great benefit—if the heart is sound.—WILLIAM AITKEN.

CHYLURIA—*See Urine, Abnormal Conditions of.*

CICATRICES.—Liable to neuralgia, contraction, ulceration, cheloid, epithelial cancers, besides other rarer affections.

CICATRICES, NEURALGIA OF.—May arise from implication of a nerve, or the bulbous end of a nerve in a contracted cicatrix. Separate the cicatrix from the parts beneath, or, if necessary, excise the end of the nerve. If such a cause cannot be found, treat on general principles.

CICATRICES, CONTRACTION OF.—Is a natural process, and results from the escape of water from a new scar as it dries up and atrophies to ordinary connective tissue; most frightful deformities often result. *Treatment.*—1. Preventive; hasten healing of large wounds by skin-grafting; prevent contraction during and for some time after cicatrization by splints and bandages. 2. Curative; divide carefully the contracted bands; keep the wound stretched during recicatrization; graft; transplant large piece of skin in suitable cases. When the contraction is merely linear, a V-shaped incision can be made, and when the tongue of skin thus formed retracts towards its base, the two outer sides of the V-shaped wound should be sewn together at and near the apex of the V. Pressure by strapping will weaken and make thin a thick cicatrix.

CICATRICES, ULCERATION OF.—Very likely to occur, especially in lower extremities, and in old and feeble people. Such cicatrices should be protected from friction and damp. *Treatment.*—Stimulant applications; rest; good living.

CICATRICES, WARTY (that is, indurated and thickened).—May be blistered or painted with iodine. Do not mistake epithelioma for these.

CICATRICES, CHELOID OF.—*Vide Cheloid.*—C. B. KEETLEY.

CILIARY REGION.—SYMPATHETIC IRRITATION and SYMPATHETIC OPHTHALMITIS.—In sympathetic irritation the changes in the sympathizing eye are chiefly functional. In sympathetic ophthalmitis they are of a destructive inflammatory kind.

Pathology.—The exact mode of transmission from the exciting to the sympathizing eye is not well known. Very interesting facts are known.

1. The change commences in the region of the ciliary body and iris of the exciting eye, and its effects are mostly seen in the corresponding part of the sympathizing eye. This region is richly supplied by branches of ciliary nerves (fifth, sympathetic, and third).

2. In exciting eye inflammatory changes are always found, and in some cases have been found to extend to the ciliary nerves. It is considered probable that the disease passes along the ciliary nerves, probably as neuritis, to some nerve centre, and thence to the other eye.

3. The optic nerve is considered to have no part in the transmission of the inflammation; but the space between the dural and pial sheaths of the optic nerve is a probable channel of communication.

Symptoms in Symyathizing Eye.—1. *Irritation.*—Eye extremely weak and irritable; patient may be able to read No. 1 of Snellen's type, but soon becomes tired, because the power of prolonged accommodation fails. Eye sometimes reddened, may be watery; neuralgic pains common. Iris not affected. No plastic exudation nor disorganizing changes take place. Liable to recur. Excision of exciting eye at once cures the disease.

2. *Ophthalmitis.*—Begins from one to three months, or more, after affection of exciting eye. May be ushered in by irritation. May be well marked from the first, or may commence in a manner so insidious as to escape notice. It consists chiefly of irido-cyclitis or irido-choroiditis, the iritis evincing a tendency to the formation of tough and extensive synechiæ. There is a zone of ciliary congestion. Thickening and muddy appearance of iris. Tendency to formation of dots of opacity (keratitis punctata) on the posterior layer of the cornea. The vitreous, when the condition of the pupil allows it to be seen, presents floating opacities. There may be neuro-retinitis. Tension of globe often increased. In the mildest forms of the disease there may be only slight serious iritis. In severe cases the eye either shrinks or may become glaucomatous with bulging of the sclerotic, total posterior synechia, secondary cataract.

Treatment.—1. When there is, as yet, neither sympathetic irritation nor sympathetic ophthalmitis the injured eye must be watched as to the seat of its inflammation, and if this is found to threaten the iris and ciliary region, precaution must be taken to do all that is possible to subdue it. Atropine should be applied. Patient kept in dark soom for long period; eye bandaged. Mild mercurials and iodide of potassium internally.

2. If irritation is set up, the foregoing remedies to be applied to both eyes, and if the exciting eye is past hope of recovery it should be excised at once.

3. If ophthalmitis is established and exciting eye quite blind it should be excised at once; but if any useful sight remains it should be saved, as it may prove the better eye in the end.

In the latter case, do all you can to save both the exciting and the sympathizing eye. (1) Use atropine drops every few hours; (2) rest the eyes by exclusion of light; (3) apply leeches, blisters, warm fomentations, &c.; (4) give mercurials.

Do not perform any operation on the eye until inflammation has subsided.—HENRY JULER.

CIRSOID ANEURISM—*See Aneurism, Cirsoid.*

CIRCUMCISION.—Done for phimosis in children and for various diseases of the prepuce and glans penis in adults. With the penis in its natural position, apply a pair of long-bladed polypus forceps exactly on a level with the corona glandis, but inclined slightly forwards rather than perpendicularly as the glans slips back, compress the prepuce with the forceps; then slice off prepuce close to the forceps; slit up mucous membrane with scissors right to glans; stitch mucous flaps to skin flaps; check hæmorrhage. In infants, instead of sutures, merely wrap a piece of lint round behind corona and also over all parts.

Prognosis.—Fatal result extremely rare.—C. B. KEETLEY.

CLAVICLE, Dislocation of—*See Dislocations.*

CLAVICLE, Fracture of—*See Fractures.*

CLAVUS—*See Corn.*

CLITORIS, Hypertrophy of.—*Definition.*—Enlargement of the clitoris, occasionally to a considerable length.

Causes.—Congenital, masturbation.

Symptoms.—Excessive sexual desire.

Signs.—The clitoris is seen to project more or less from the vulva.

Diagnosis.—From inflammation (rare) by absence of pain.

Prognosis.—Guarded.

Treatment.—Cold applications, physiological rest, clitoridectomy.—HEYWOOD SMITH.

CLUB-FOOT.—Four types: 1, talipes varus; 2, talipes valgus; 3, talipes equinus; 4, talipes calcaneus. Talipes equino-varus (a combination of 1 and 3) most common.

Causes.—The cause of congenital talipes varus, or equino-varus, is arrested development. At the commencement of their development, the lower extremities are so placed that, if extended, the feet would point backwards; hence they have afterwards to rotate on their axes; when this rotation is not fully accomplished in the foot, club-foot results. Talipes valgus is only another name for flat foot, which results from excessive standing or walking when the general strength is small; the muscles, being then weak, do not sufficiently assist the ligaments, which give way to the strain. Infantile paralysis leads to equino-varus, because that is the position in which gravity places a foot uncontrolled by healthy muscles.

Symptoms—Pure varus.—Very rare; in it, only inner border of foot is raised, and anterior part of foot is bent inwards on posterior half.

Equino-varus.—In this, the heel is more or less raised; in severe cases the bones are much altered; the dorsum of the cuboid and fifth metatarsal bone sustains the weight of the body. The scaphoid and inner edge of the metatarsus looks upwards; the inner malleolus almost touches the scaphoid, and the astragalus is pushed outwards. Fibula lies in a line beyond tibia; tuberosity of os calcis looks upwards; in talipes calcaneus the heel is down and the front of the foot up. The tendons contracted in each case will be mentioned under the head of treatment.

Course.—If left alone, patient learns to walk on deformed foot; callosities form where there is friction or pressure; the leg wastes; the foot and leg thus get the peculiar clubbed appearance.

Treatment.—Mild cases do not require tenotomy; apply friction, and twist the foot for a quarter of an hour three times a day into its natural position, pulling and fixing foot in position with strapping; strapping combined with splints; Barwell's elastic bands; shoes, etc., for talipes. The above contrivances used after tenotomy.

Tenotomy.—For equinus, divide tendo-Achillis; for equino-varus, tendo Achillis after tibialis posticus and anticus (sometimes also plantar fascia, and some plantar muscles). Valgus and calcaneus seldom require tenotomy.—See Flat-foot. Tenotomy knives, blunt-pointed and sharp-pointed; pads of lint; hot-water can and strapping; bandage; splint. Tendo Achillis.—Position, on face. Assistant makes tendon tense; pass a sharp-pointed knife beneath tendon, one inch from insertion; place left forefinger over it; cut gently with sawing motion towards skin; assistant should relax when he feels that the tendon has gone; withdraw knife and instantly; place finger over wound; then put on pad instead of finger, [illegible]ap, bandage and splint. Tibialis posticus—One inch above inner malleolus. Inner edge of tibia. In fat infants, midway between anterior and posterior borders of leg. Insert sharp tenotome half an inch, so as to open deep fascia. Substitute blunt tenotome; pass this with one surface towards tibia, and other towards tendon. Assistant meanwhile holds foot inverted. Now foot is inverted, at same time edge of tenotome is turned to tendon. If blanching of foot and much bleeding show wound of post-tibial artery, merely pad and evenly bandage and confidently expect good result. But postpone instrument treatment for a fortnight. Tibialis anticus.—Merely extend foot, insert tenotome, and divide tendon from behind forwards. Peronei.—Sometimes divided for valgus. Divide behind external malleoli or a little higher; adduct foot.

After-treatment.—Three or four days after tenotomy, commence to extend by strapping, splints, Scarpa's shoe, elastic bands, or some other mechanical contrivance, according to gravity of case. In infants, extension should be effected in a month. In adults, three or four months may be occupied. At first the instrument should be shaped to fit the deformity; never force a foot into an ill-fitting instrument; attend daily to the case; beware of pressure sores; plaister of Paris bandages may be used instead of movable apparatus.

Process of healing in a divided tendon.—The divided ends of the tendon retract, and the neighboring cellular tissue presses in between them, filling the interspace. In this cellular tissue, corpuscles and lymph (inflammatory new formation) are poured out, which organize into fibrous tissue, uniting and exactly resembling in structure the divided tendon. The process resembles that by which the external callus unites a fractured bone. The advantage of tenotomy is that this new uniting medium is so much more extensible than the original tendon. Many surgeons now put up the foot in plaister of Paris as soon as the tendons have been divided; and Ogston treats even severe cases of club-foot with plaister of Paris, and without previous tenotomy.—C. B. KEETLEY.

COCCYDYNIA.—A painful affection of coccyx; female sex; generally follows an injury, this injury may be received in parturition; comes on when coccygeal muscles are put in action, as by sneezing, coughing, walking, defæcation, &c.

Treatment.—If obstinate, divide all muscular and ligamentous structures from borders and tip of coccyx.

COCCYX, Dislocation of—*See Dislocations.*

COCCYX, Fracture of—*See Fractures.*

COLIC.—*Natural History.*—A painful affection of some portion of the abdomen, caused by violent contraction of the muscular fibre of some portion of the intestinal canal, arises generally from indigestion, exposure to cold, the effect of lead poison, or other general cause. The bladder may participate in the spasm, the urine being either frequently ejected or suppressed. Colic is usually sudden in its attack at any period of life, the patient without any previous indisposition being unexpectedly seized with a severe fixed pain in some part of the abdomen, but which is relieved on pressure, so that he either sits doubled up, or rolls on the ground, or lies flat on the belly. When much air is generated, the bowels are greatly distended, and the pain is compared to a twisting or wringing around the navel, accompanied with soreness. The walls of the abdomen participate in the internal spasm, so that the navel is drawn in towards the back, or the heads of the recti muscles become exceedingly prominent, resembling so many round balls. The bowels are generally but not always constipated, and the stomach may reject both food and medicine. The pulse is little altered at the commencement of the attack; but if the paroxysm be prolonged, and the patient exhausted by pain, it may be hurried and frequent. The tongue is generally clean, although sometimes white and coated.

The Treatment is by opiates, chlorodyne stimulants, and purgative medicines. When the bowels are constipated, five grains of calomel, fifteen grains of jalap, and one grain of opium should be administered immediately, followed by ℞ Mist. Camphoræ c. Magnesiæ Sulphat, ʒ j.; Tinct. Hyoscyami, mxv. to xx.; Tinct. Cardamomi, ʒ j. To be repeated every five or six hours until stools are obtained. In mild cases a scruple of rhubarb, or half an ounce of castor oil, or other mild purgative, combined with a grain of opium, may be substituted for the opium, calomel and jalap. Opium in full doses (gr. i. to ii.) is also more generally useful in uncomplicated colic than any other remedy. Enemeta generally give immediate relief. Externally, the application of large bags filled with hot camomile flowers, or of heated sand, or heated salt, or the stomach-warmer filled with hot water, warm bath, fomentations, or a large linseed or mustard poultice over the abdomen, are useful. The diet should be sago or arrow-root, with or without brandy, as required and prescribed.—WILLIAM AITKEN.

COLIC, PAINTER'S—*See Saturnism.* .

COLLAPSE—*See Shock.*

COLLES' FRACTURE—*See Fractures.*

COLLOID—*See Cancer.*

COLOBOMA OF IRIS—*See Iris, Diseases of.*

COLORADO—*See Dengue.*

COLOTOMY.—*When required.*—In obstruction to the large intestine, as from stricture of rectum (malignant or otherwise), or imperforate anus; in disease of rectum or colon, *e. g.*, ulceration, or recto-vesical fistula, where it is desirable to prevent the irritation of fæces in the diseased parts. Three operations, viz.: 1. Amussat's in right lumbar region; 2, Amussat's in left lumbar region; 3, Littre's in left groin. The left lumbar operation is sometimes named after Callisen, who merely attempted, but never effected, an operation.

Amussat's in left lumbar region.—Scalpel, forceps, retractors, director, handled needles, &c.; incision midway between last rib and crest of ilium, transverse or oblique, *e. g.*, paralled to nerves; extent, 5 inches: centre half an inch posterior to middle point of crest of ilium (Allingham); outer edge of quadratus lumborum thus exposed; now divide, from quadratus outwards, on a director, the muscles to the extent of the skin wound (latissimus dorsi, obliquus externus and internus, and transversalis); secure essels; distinguish, if possible, transversalis fascia from peritoneum; divide fascia; find colon; pass two ligatures through skin at both edges of wound, piercing colon on their way; make opening in bowel big enough to admit forefinger; pull out hoops of ligatures and divide them, thus making four ligatures; tie each. Oil margins of wound and place patient in bed. Occasional difficulty in finding bowel, especially when there is not complete obstruction and it is nearly empty. Use of distending injection before operation. Bowel must not be sought for too far out from spine; always lies in front of or below kidney. Roll patient on his left side, keeping finger in wound, bowel will sometimes then fall upon finger; not much danger of wounding peritoneum if bowel be distended. Much danger of wounding peritoneum in infants, because descending mesocolon often exists. *Operation in right lumbar region* done in a similar manner.

After Treatment.—Sedatives at first; dress with oakum; protect edges of wound with zinc ointment; india-rubber bag and soft bandage afterwards; give good diet early; if opening contracts, use sponge-tents; lower part of intestine should, after convalescence, be occasionally washed out with warm water.

Prognosis.—According to Cæsar Hawkins two-thirds recovered. But many more cases have since been recorded, and the fatal cases appear to die not so much from operation as from original disease; therefore operation should be done in time.—C. B. Keetley.

COMPRESSION OF BRAIN.
CONCUSSION OF BRAIN. } *See Head, Injuries of.*

CONDYLOMATA.—*Causes.*—Mostly syphilis, gonorrhœa and dirt.

Pathology.—Papiliform, but sarcomatous or made of soft connective tissue in structure; non-recurrent; infectious.

Seat.—About anus, foreskin, prepuce, and mucous membrane of mouth.

Treatment.—Touch with argent. nit.; zinc oxide, calomel, copper sulphate; cleanliness, dryness; wear prepuce back.

CONJUNCTIVA, Diseases of.—Ophthalmia.—This term is applied to all forms of conjunctivitis. Chief forms are 1, Purulent; 2, Muco-purulent; 3, Membranous; 4, Granular.

Purulent Ophthalmia is generally due to contact with pus from the urethra or vagina, which may be gonorrhœal or otherwise. The quality of the infecting discharge greatly influences the nature of the ophthalmia. When caused by gonorrhœa the course is very violent. When occurring in newly-born children it is called O. Neonatorum.

Symptoms.—In from twelve to forty-eight hours after infection there are itching and slight injection of the conjunctiva, these soon become intense; then chemosis, tense swelling of the lids, great pain and discharge, at first serous, then turbid, then uniformly purulent. If untreated the discharge ceases in about six weeks, leaving the palpebral conjunctiva thickened, relaxed, and more or less granular. Cicatricial changes follow. The cornea is in danger from two chief causes, viz., (1) strangulation of the vessels from pressure, and (2) the influence of the discharge. If within the first few days the cornea be hazy and dull, it may partly or entirely slough. In milder cases transparent ulcers may appear and sometimes cause perforation. In many cases no corneal opacity occurs.

Treatment.—When one eye only is affected, carefully protect the other by a watch glass strapped on. Frequently and thoroughly remove the discharge by free douching with water. Use astringent or caustic lotions or drops every hour in severe cases, *e. g.*, lotio aluminis, gr. x. ad ℥ j.; lotio zinci, gr. x. ad ℥ j.; lotio hydrarg. perchlor. gr. 1–8 ad ℥ j.; lotio argent. nit. gr. ij. ad ℥ j. Apply simple ointment to the eyelids to prevent adhesion. Evert the lids and brush a strong solution of nitrate of silver (gr. x. or xx. ad ℥ j.) freely over the conjunctiva once daily, and well wash off immediately afterwards either with water or with solution of common salt. Repeat less frequently as the discharge diminishes. In case where the lids are so swollen that nothing can be applied to their conjunctival surfaces, the outer canthus can be divided, or Mr. Critchett's method of dividing the upper lid by a vertical incision can be adopted.

Treatment should be continued as long as any discharge or granulations remain on the lids, for fear of a relapse which is apt to occur.

Muco-purulent Ophthalmia (Catarrhal Ophthalmia).—Very common, very contagious, mostly attacks both eyes, differs in severity in members of the same household, who are generally attacked at the same time. *Symptoms.*—Congestion of conjunctiva, with patches of ecchymosis. Gritty pain, sometimes severe. Spasm of lids. Free muco-purulent discharge. Lids somewhat swollen and red, never tense. The cornea seldom suffers.

Spontaneous recovery takes place in about two weeks. *Treatment.*—Any mild astringent lotion or drops will cut the malady short. An outbreak of this malady in a crowded community is serious. Very common in pauper schools.

Membranous Ophthalmia (Diphtheritic Ophthalmia).—Very rare in this country, and must not be confused with muco-purulent or purulent ophthalmia, in which there is often a distinct layer of inspissated pus beneath the lids. In membranous ophthalmia the whole thickness of the conjunctiva is occupied by a solid exudation, which is called "diphtheritic" by some surgeons. It may appear in patches, or may cover all the whole inside of the lids.

Granular Ophthalmia.—Very common. *Symptoms.*—First, appearance as of small granules like sago-grains on the inner surface of the lower lid, due to inflamed lymphatic follicles. These extend to upper-lid; then progressive changes in the palpebral conjunctiva in which it becomes thickened, vascular, and roughened by granular elevations. New tissue is formed in the deep parts of the conjunctiva, which afterwards is partly absorbed, and partly undergoes cicatricial contraction. *Causes.*—Feeble health. Prolonged residence in badly-ventilated dwellings. *Treatment.*—Generally tedious. Evert the eyelids and apply a solution of nitrate of silver (gr. xx. ad ℥ j.) with camel's hair brush, once, twice, or thrice a week; or apply the mitigated nitrate of silver stick; in each case wash the lids with water before inverting them. Solid sulphate of copper may be used instead of these. Glycerine of tannin applied daily is beneficial. *Results.*—(1) Haziness of cornea; (2) Pannus (see cornea); (3) Entropion, Trichiasis.

Xerophthalmia (Xerosis. Cuticular conjunctiva) is a condition of excessive dryness of the ocular and palpebral conjunctiva

Pterygium is a triangular patch of thickened conjunctiva, generally placed opposite the palpebral fissure, its apex pointing to or encroaching upon the cornea. Rare in this country. *Treatment.*—Dissect up from apex and transplant it into a cleft below the cornea. This is said to be more effectual than excision or ligature.

Pinguecula, a harmless patch of yellowish white thickened conjunctiva situated near margin of cornea.

Lupus may occur on conjunctiva.

Warts are sometimes seen on the ocular and palpebral conjunctivæ; they are cauliflower excrescences. To be snipped off with scissors.

Epithelioma and Sarcoma may occur on the conjunctiva.—Henry Juler.

CONJUNCTIVITIS—*See Conjunctiva, Diseases of.*

CONSTIPATION.—*Etiology.*—The immediate causes of this very common symptom may be summed up as: 1. Mechanical obstruction in some part of the alimentary canal, directly interfering with the passage of the fæces. 2. Deficient peristaltic action of the intestinal muscular coat, especially of that of the large bowel, generally due to impaired excitability of the nerves. 3. Deficiency of secretions, particularly of the intestinal secretion and bile, or, as some believe, their excessive absorption; the fæces being consequently too solid, while at the same time the peristaltic action is diminished.

The first class of causes will be separately considered. The other two classes may be associated with organic diseases, but are very frequently the consequence of mere functional disturbance. This may arise from a great variety of causes, of which the chief are habitual neglect of the act of defecation, either from carelessness, want of time, or undue modesty; *indulgence in astringent articles of diet*; habitual use of opium; excessive smoking; sedentery habits, especially if combined with much mental work; enervating habits, particularly lying in bed to a late hour; anæmia; debility, and want of tone from any cause; hepatic derangements; most acute febrile diseases; various chronic affections, especially those connected with the nervous system; uterine and ovarian derangements; and the presence of lead in the system.

Undoubtedly some individuals are predisposed to constipation, particularly those who are of a slow, lethargic temperament. This disorder is more common in females, and is more liable to arise as age advances, though it is of very frequent occurrence in young women.

Symptoms.—Constipation simply means that the stools are not passed with sufficient frequency, being at the same time generally deficient in quantity, as well as too dry and solid. In many instances it is a mere temporary derangement, but in others the bowels are habitually confined. Some individuals state that their bowels are regular, simply because they go to stool every day, but in reality they suffer from habitual constipation, as they only pass small lumps of hard fæces; hence the necessity of making close inquiry in any doubtful case. The degree of constipation varies much, but it is not uncommon to meet with patients, especially females, whose bowels are only moved once or twice a week; and sometimes the intervals are even longer than this, being in exceptional cases quite extraordinary. Hence fæces may accumulate to an enormous extent in the intestines, distending them greatly, and when discharged, they are firm, often extremely hard, dry, in the form of scybalous lumps or large masses, frequently pale, and unusually fetid. Hard excrement may cause irritation, setting up a kind of diarrhœa attended with the discharge of mucus or pus, and thus may mislead as to the actual conditions present, the fæces being in reality retained. The passage of indurated fæces may give rise to a great deal of pain about the anus, with straining, and sometimes discharge of blood. When retained, excrement is very liable to undergo decomposition, thus giving rise to much painful flatulence; the secretions are also still more interfered with, as well as the motor functions of the bowels, and dyspepsia, usually of an atonic kind, is set up. The mechanical effects of accumulated fæces are often very serious, and they may cause complete intestinal obstruction, or may lead to ulceration and perforation. Not uncommonly an accumulation can be detected by physical examination of the abdomen, and it may simulate various abdominal tumors. As a rule, tumors due to accumulation of fæces correspond in position and shape to the cæcum, or to some part of the colon; they often have a doughy feel, yielding to pressure, by which they are sometimes much altered; and percussion over the corresponding part of the abdomen generally elicits a combination of dulness and tympanitic sound. In some cases, however, these accumulations produce extensive, irregular, solid enlargements, greatly resembling masses of cancer. Therefore the possibility of any doubtful abdominal tumor being due to fæces should always be borne in mind, and the effects observed of a thorough clearing-out of the bowels by means of aperients and enemata, before a positive opinion is given.

Upon the general system the effects of habitual constipation are frequently very marked. It produces a state of nervous depression, and by interfering with digestion and nutrition may cause much wasting and anæmia.

Treatment.—It is needless to enumerate here the ordinary remedies employed in the treatment of accidental and temporary constipation, as these are discussed in treatises on therapeutics. A few remarks are, however, necessary regarding the management of habitual constipation. 1. It is most important to impress upon patients the necessity of attending to the habit of going to stool daily, at the same hour, and of having a proper evacuation, because if this is neglected for a long period it becomes extremely difficult to restore the bowels to their normal activity. 2. Change in diet may assist in removing constipation. Astringent articles of food must be avoided. Bran bread, oatmeal cakes and porridge certainly prove efficacious in not a few cases, and figsor somewhat acid fruits are also useful in some instances. Any injurious habits which tend to confine the bowels must be avoided, and a proper amount of daily exercise should be taken. Cold bathing with douching of the abdominal walls is often beneficial, and in women in whom these walls are relaxed, the plan of wearing a broad bandage or elastic support round the body, firmly applied, is exceedingly serviceable. 3. It must not be forgotten that the inactivity of the bowels may be due to a general want of tone, and hence tonics are frequently useful, particularly those which improve the condition of the alimentary canal. The most beneficial are the non-astringent preparations of iron, mineral acids with bitter infusions or tinctures, strychnia, or extract or tincture of nux vomica. Should there be any lead in the system giving rise to constipation, iodide of potassium is the essential remedy. 4. Various aperient medicines have usually to be employed, but it is highly desirable to avoid falling into the habit of relying upon these agents if possible, especially the stronger purgatives, and, therefore, as soon as the desired effect has been produced in any case, and the bowels have been properly emptied, purgatives should be stopped, and the patient impressed with the importance of trying to keep up a regular action by attention to the matters already indicated. Among the most efficacious aperients in these cases are confection of senna or sulphur taken early in the morning, compound rhubarb pill, sulphate of magnesia, ʒ½ to ʒj three times a day, which is often beneficially combined with sulphate of iron; sulphate of soda, Seidlitz powders; sulphate of potash, particularly recommended for children; aloes, in the form of watery extract or decoction, especially valuable if the colon is torpid, and extract of belladonna in doses of ⅙th to ¼th gr. once daily.—The last-mentioned has deservedly come into high repute, and has been particularly recommended by Trousseau; a combination of this remedy with aloes and extract of nux vomica is very serviceable in some cases. Not uncommonly it becomes necessary to use stronger purgatives from time to time, such as extract of colocynth, blue pill, calomel, jalap, or gamboge. If the bile appears to be deficient, podophyllin and other cholagogues are valuable, or some recommend inspissated ox-gall. Some of thsse remedies may be given in different combinations with advantage, mad up into pills with extract of gentian or extract of hyoscyamus. It seems best to administer them just before or during a meal. Various aperient mineral waters are often serviceable; of these Friedrichschall water is deineraldly in high repute, and I have found in several cases great benefit folservethe habitua use of Hunyadi Janos water.

The employment of simple enemata in cases of habitual constipation is not carried out to the extent which it deserves. Unquestionably a morning injection of water, soap and water, or a solution of salt, will often prove highly efficacious; if necessary a little castor oil may be added. The use of a suppository of soap is a popular remedy in some parts, especially in the case of children. It has been recommended to galvanize the abdominal walls in obstinate cases.

Occasionally, as the result of long-continued accumulation, the rectum becomes greatly distended with solid and dry excrement, which has to be mechanically scooped out. Enemata may be used for the purpose of softening this hardened mass of fæces and breaking it down.—FREDERICK T. ROBERTS.

CONSUMPTION—*See Phthisis.*

CONTUSION—*See Bruise.*

CONVULSIONS.—Spasms may be defined as involuntary contractions of the muscles, varying widely as regards their intensity, and being either intermittent and interrupted, with intervals of relaxation, the movements being often of a jerky character—clonic spasms; or more or less continuous and persistent—tonic spasms, these in their extreme form culminating in permanent rigidity. If spasms are accompanied with severe pain, they constitute the condition known as cramp. The violent tonic contractions observed in lockjaw and strychnine-poisoning are named tetanic. There is not, however, any marked line of demarcation between these different forms of motor disorder.

The spasmodic movements implied by the term convulsions vary considerably in their severity and extent, and also as to the parts of the body, which they involve. Thus they may be slight and localized, unilateral or more or less general. Some writers include under convulsions all forms of motor disorder in which there are unusual involuntary movements, such as fibrillar trembling of muscles, muscular flickerings, various kinds of tremor, and choreic movements. Ordinarily, however, the term implies more or less marked spasmodic movements, and these may be so violent as actually to rupture the muscles. Eclampsia is a word which is now often used to characterize all forms of powerful convulsions of a more or less epileptiform type, whatever their cause may be. According to the extent and localization of the convulsions, we are frequently able to refer their origin to some special part of the nervous system, as will be hereafter pointed out. Not uncommonly convulsions are accompanied or followed by partial or complete loss of consciousness. They are of much importance in children, in whom a series of convulsive fits are liable to occur from very slight causes—infantile convulsions. They are frequently preceded by premonitory indications of nervous disturbance, such as twichings, grinding of the teeth, restlessness or peevishness, which in children should always be looked upon as warnings. It is unnecessary to describe the distortion of the features, and the various movements of the limbs and body which may result from convulsive spasms, these being usually a combination of the clonic and tonic varieties, the former predominating. The chief dangers in connection wlth convulsion arise from implication of the respiratory muscles or glottis, leading to grave interference with breathing, from obstruction to the return of blood from the brain, and from the exhaustion which the extreme violence or frequent repetition of the fits may cause, especially if they prevent sleep for a long period. Serious sequelæ may follow as a direct consequence of convulsions, such as hemiplegia, strabismus, loss of sight, smell, or hearing, defect of speech, or impairment of mental faculties.

Etiology.—All forms of motor disorder now under consideration are referable to some kind of irritation, acting upon some portion or other of the nervous system. Convulsions have been immediately attributed to "an abnormal discharge of unstable gray matter."—(Hughlings Jackson.) They originate in some irritation or discharging lesion, either direct or indirect, affecting this gray matter. The main causes may be arranged thus: 1. Centric *a.* Injuries to the head, especially fracture of the skull, with irritation of the gray matter by spiculæ of bone. *b.* Various organic diseases of the brain and cord or their membranes, viz., all forms of meningitis, hydrocephalus, cerebral hæmorrhage, rupture of an aneurism, embolism, softening tumor. *c.* Idiopathic, dynamic, or essential. Here the convulsions are independent of any obvious organic mischief, but are supposed to result from some vascular or nutritive disturbance in the brain, as in some cases of epilepsy, hysteria, or the convulsions induced by strong emotions. *d.* Circulation of abnormal blood through the central nervous system, as exemplified by the convulsions which in children sometimes usher in, or occur during the course of acute specific fevers or inflammatory diseases; uræmic convulsions; and those which may be associated with imperfect aeration of the blood, or, it is said, with rheumatic fever, jaundice, syphilis, tuberculosis, and rickets. In the two conditions last mentioned, however, the nervous system is probably highly susceptible, and convulsive movements may be excited by very slight reflex disturbance. 2. Eccentric, reflex, or sympathetic. In this class of cases the convulsions are due to some reflex irritation, particularly in connection with dentition; digestive disorders; intestinal worms; or the passage of a gall-stone or a renal calculus. Occasionally they result from direct irritation of some local nerve, the pricking of a pin in the clothes of a child, the application of a blister, or a burn of the skin. Puerperal convulsions are either uræmic or reflex in their origin.

The most favorable periods of life for the occurrence of general convulsions, independent of organic disease, are childhood, especially during the periods of dentition, puberty, when cutting the wisdom teeth, and at the change in life. In children the ordinary causes are reflex irritation, the onset of some acute fever or inflammation, tubercular meningitis, or the presence of some chronic constitutional illness. Later in life they are most frequently associated with epilepsy, with organic affections of the nerver-centres, or with uræmia.

Treatment.—In treating spasmodic movements, if they should call for special interference, and especially if they are of the nature of general convulsions, the indications are: 1. To look for any reflex irritation, and to remove this if possible, particular attention being paid in the case of children to the teeth and alimentary canal, the gums being lanced, or an aperient or emetic given if required; at the same time regulating the feeding. It is also well to examine the clothes for any source of irritation. 2. Treat any disease with which the convulsions may be associated, such as rickets, tuberculosis, epilepsy, central organic disease, or blood-poisoning. 3. To mitigate or check the spasmodic movements. During a paroxysm of convulsions the recumbent posture, freedom from every disturbance, relaxation of the clothing about the neck and chest, and a free current of cool fresh air are needed. It is not advisable to restrain the movements except in so far as to prevent injury to the patient. Water may be sprinkled over the face and chest. If the convulsions continue, a warm bath containing mustard, the application of ice to the head, warm pediluvia, cold or warm affusion, the application of sinapisms to the nape of the neck, epigastrium, or extremities are the chief remedial measures which may be employed. Many practitioners resort at once to the application of leeches to the temples or back of the neck, or to venesection, especially in the case of robust children; but in most cases this is needless or injurious, and as a rule removal of blood is only indicated when there are signs of serious interference with the respiratory functions. The principal medicinal remedies available are narcotics and antispasmodics, especially bromide of potassium, hyoscyamus in full doses, opium, hydrate of chloral, chloroform by inhalation, and asafœtida by enema. Of course most of these drugs need due caution in their administration. It is of the greatest importance to endeavor to procure sleep if this is much interfered with, particularly should there be much exhaustion. The milder forms of spasm and cramp may often be considerably mitigated by friction, dry heat, judicious restraint, and other measures. 4. To treat the consequences of convulsions. The chief dangers are from suffocation and exhaustion. To obviate the former, removal of blood and artificial respiration are indicated. To prevent or counteract exhaustion, it is extremely important to administer abundant liquid nourishment, especially in the case of weakly or badly-fed children, and if it cannot be taken by the mouth, enemata must be employed. Alcoholic stimulants are also most useful in many cases, being sometimes required in considerable quantities, along with medicinal stimulants, such as ammonia, ether, camphor, or musk. The administration of food and stimulants often promotes sleep most efficiently.—FREDERICK T. ROBERTS.

CONVULSIONS, Puerperal—*See Puerperal Convulsions.*

CONVULSIVE TREMOR.—*Definition*—All cases of non-rhythmical tremor or clonic convulsive movements which are unattended with loss of consciousness, but which nevertheless are paroxysmal in character.

Causes.—Very few cases have been recorded and very little is known regarding the etiology of this affection. Sexual and alcoholic excess and sunstroke have been supposed to have been the cause in three of the cases observed. In others no approach to a relation of cause and effect could be established.

Symptoms.—Paroxysms of clonic convulsions affecting the voluntary muscles and unattended by loss of consciousness, or by mental aberration, though sometimes there is emotional disturbance. Vertigo and pain in the head are also occasional symptoms.

Prognosis.—Generally favorable. The disease is amenable to proper medical treatment.

Treatment.—Bromide of zinc given in solution either in water or simple syrup in the proportion of one drachm to the ounce. Of this mixture ten drops are to be given three times a day for the first two weeks, then fifteen drops three times a day for the next fortnight, and so on increasing five drops for the doses of each subsequent two weeks. This course should be continued for from three to six months and then the doses gradually reduced.—WM. A. HAMMOND.

CORACOID PROCESS, Fracture of—*See Fractures.*

COREDIALYSIS—*See Iris, Disease of.*

CORNS.—*Causes.*—Intermittent pressure, or friction from tight or over-loose boots.

Pathology.—At first a tightening of cuticle, then a bursa forms beneath; afterwards cuticle may grow thin while fibrous structures beneath hypertrophy and form base of corn, or the pressure of the thickened cuticle may cause absorption of the parts beneath; tendency to inflame and suppurate. Resulting lameness may lead to secondary effects.

Treatment.—Remove cause. Proper boots. Acetic acid, nitrate of silver, alkaline solutions, soap, water-dressings, etc., to soften cuticle; knife to remove it. Open suppurating corns. Soft corns (*i. e.*, those which form beneath the toes) may be also cured by cotton wool between the toes, dusting with zinc oxide or French chalk, and by above remedies also. Boots should be broad in sole, and straight along inner border. Belladonna plaister.—C. B. KEETLEY.

CORNEA.—Inflammation of the cornea may be circumscribed or diffused; may involve its proper layers, or may be confined to its anterior or posterior epithelial layer. It may be local, leading generally to suppuration or ulceration, or it may arise from constitutional disease, as inherited syphilis. It may exist with other inflammations, as in kerato-iritis, cyclo-iritis.

LOCAL KERATITIS (Corneitis).—*Symptoms.*—Commences with a more or less perfect zone of pinkish-red vessels around the margin of the cornea. Photophobia more or less severe. Cornea becomes hazy, and has a steamy or ground-glass appearance. Generally there is lachrymation, and frequently pain in and around the eye. *Pathology.*—The intercellular substance becomes opaque from infiltration with leucocytes, which are supposed to have emigrated from the surrounding vessels. The cells of the corneal tissue proper also undergo proliferation into small corpuscles, greatly resembling leucocytes. The disease often has a tendency towards recovery, but more frequently leads to suppuration and ulceration.

ULCERATION OF CORNEA is preceded by inflammatory infiltration, and the inflamed part breaks down at the centre, forming an ulcer with more or less infiltrated base and edges. *Symptoms.*—Photophobia, congestion more or less, consisting of a circular zone of vessels beneath the conjunctiva at periphery of cornea, and sometimes also of conjunctival vessels. Pain sometimes acute.

Ulcers may be (1) small and central, with infiltration of base and edges. These generally heal quickly, but leave a hazy (nebula) or an opaque spot (leucoma). 2. Small and central, without much infiltration. These heal slowly and with loss of tissue, perhaps without opacity, but give a facetted appearance to the cornea. 3. Phlyctenular ulcers (Herpes Corneæ.) 4. Serpiginous ulcers. 5. Acute suppurating ulcer following abscess or otherwise.

Treatment.—First secure rest, either by bandaging the affected eye, and so reducing friction against eyelids, or by shading both eyes. Soothe local pain by atropine drops. In suppurating cases apply hot fomentations to lids; if absess is defined, open by valvular incision. When indolent, stimulate ulcer by astringent drops, ointment of yellow oxide of mercury, calomel powder, eserine drops (gr. iii. ad ℥ j.), &c.

Counter-irritants to temple, as seton or blister. Constitutional treatment.

HYPOPION signifies a collection of pus or purolymph in the lowest part of the anterior chamber. The pus is divided (1) from the rupture of an abscess through the posterior layer of the cornea; (2) from suppuration of the epithelioid layer covering Descemets' membrane; (3) from surface of iris.

ONYX is a term applied to that condition in which pus is observed between the layers of the cornea at its lower part.

SYPHILITIC KERATITIS (Interstitial K. Parenchymatous K.). *Symptoms.*—The visible changes of the cornea are usually preceded for a few days by some ciliary congestion and lachrymation; then there is cloudiness in one or more patches, and after a few weeks a ground-glass appearance. Frequently accompanied by iritis and posterior synechiæ. Bloodvessels often appear in the layers of the cornea, extending from the ciliary vessels; they are thickly set in patches (salmon patches), of a reddish-pink color, and of various shapes; they may extend all over the cornea, except, perhaps, to the immediate centre. The disease is always symmetrical (contrast with local keratitis), but second eye is usually attacked a few weeks after the first. Age generally between six and fifteen. Often accompanied by inflammation of the ciliary region and iris, which may give rise to secondary glaucoma, to stretching and elongation of the globe in the ciliary zone, or to softening of the eyeball; but, as a rule, the cornea throughout its whole structure undergoes a chronic inflammation, showing no tendency either to suppuration or ulceration, the inflammatory products being partially or entirely absorbed after several months. *Cause.*—Inherited syphilis. Other signs of inherited syphilis are usually present. If no other signs are shown in the patient, a history of infantile syphilis can generally be ascertained, either in the patient or his brothers and sisters; or a history of acquired syphilis in the parents may be traced. A few cases have been seen in which this disease has occurred as the result *of acquired syphilis.*

Treatment.—A long but mild course of mercury. Mercurial inunction, gray powder, blue pill, &c. Iodide of potassium may be combined with these. Keep a strict watch against salivation. If the patient be anæmic or strumous, give iodide of iron, bark, quinine, &c. Keep the eyes shaded. Use atropine drops daily, as iritis may occur without being detected through the opaque cornea. When inflammation has subsided, apply calomel powder, or ointment of yellow oxide of mercury to the cornea daily, in order to promote the absorption of the opacity.

KERATITIS PUNCTATA is characterized by the presence of small dots of opacity on the posterior elastic lamina of the cornea. They are generally arranged in the form of a triangle, having its apex at the centre, and its base towards the lower margin of the cornea. This condition is generally secondary to some form of inflammation of iris. It is frequently seen in sympathetic ophthalmitis.

Arcus senilis is caused by fatty degeneration of the corneal tissue just within its margin.

PANNUS is the result of friction from a granular condition of the upper lid, trichiasis, &c. It is characterized by haziness of the cornea, with vascularity, the vessels being continuous with those of the conjunctiva, and the anterior layers of the cornea more or less infiltrated with plastic matter. *Treatment.*—1. Try to cure the granular lids. 2. The operation of syndectomy or peritomy—that is, the removal of a zone of conjunctival and sub-conjunctival tissue from around the cornea—is strongly recommended by Mr. Critchett in old intractable cases of pannus. 3. Very severe and universal pannus is best treated by inoculation with pus from purulent ophthalmia, or even from gonorrhœal discharge. It is a severe remedy, and may be followed by sloughing of cornea. It should never be resorted to if there is any portion of the cornea transparent.

CONICAL CORNEA is caused by a bulging forwards of the central part of the cornea forming a blunt conical curve, which gives rise to irregular astigmatism and myopia. In advanced cases the protrusion of the cornea is very evident, and the apex of the cone may become nebulous. In some cases vision may be improved by concave glasses in combination with a screen having a narrow slit or small hole in it. In advanced cases operation is indeed: (1) Graefe's. Shave off apex without entering anterior chamber, then apply mitigated nitrate of silver stick to the raw surface to cause ulceration and cicatrization. (2) Cut off apex with a cataract knife, enter anterior chamber, leave wound to unite by itself or use sutures; use atropine drops.

WOUNDS OF CORNEA.—When penetrating, if iris is prolapsed push it back with a blunt instrument, and order atropine drops; if iris not protruding, order atropine drops. It only abraded, still order atropine drops. Close the eye with a bandage to prevent friction.—HENRY JULER.

CORYZA.—A brief description will be given of the condition which frequently results from taking cold in some way or other, and which has been specially designated catarrh, or a cold. The entire system is affected, but the more characteristic phenomena are due to a catarrhal inflammation involving mainly the conjunctiva, and the mucous lining of the upper air-passages, namely, the nose and its communicating sinuses, the throat, and the larynx and trachea. Not uncommonly it extends into the bronchi to a variable extent; and sometimes the mouth, œsophagus, stomach, or intestines are implicated. The complaint most commonly results from exposure to wet and cold, and many persons are liable to repeated attacks, which come on whenever the weather is unfavorable, and especially when it suddenly becomes damp and cold. The phenomena very much resemble those which are observed in influenza, and in the early stage of measles; as well as those which arise in some persons from inhaling the emanations from hay, ipecacuanha powder, and certain other vegetable products, or from the action of iodine upon the system.

Symptoms.—These are both general and local, and the two classes are observed more or less simultaneously. The patient feels chilly and out of sorts, indisposed for any occupation or mental effort, languid and tired, and has a sensation of general aching or soreness of the limbs and body. More or less pyrexia supervenes, and the temperature may become raised to 100°, 101°, 102°, or even higher. This is accompanied with a somewhat frequent pulse, usually a dry skin, furred tongue, loss of appetite, constipation, and concentrated, high-colored urine, which deposits urates on standing. Some persons feel exceedingly weak and depressed when suffering from catarrh, and especially if they have been previously debilitated. The local symptoms are in accordance with the parts involved in the catarrhal condition. At the outset various subjective sensations are experienced, namely, headache, especially over the forehead and temples, with a feeling of weight and heaviness; pains about the face, chiefly of a neuralgic character, which may be accompanied with tenderness; smarting of the eyelids, and aching in the eyeballs; dryness and heat of the nares; soreness of the throat; and not uncommonly pain and stiffness in the neck. Very soon the eyes become red and begin to water freely; while a running from the nose sets in, which is specially termed coryza, the discharge being at first quite thin and watery, as well as very irritating, so that it makes the parts over which it flows quite sore. Sneezing is often a troublesome symptom. On examination the throat is seen to be more or less red and swollen, and swallowing is painful; while the catarrhal condition of the air-tube gives rise to hoarseness or loss of voice, cough and pain in speaking, or coughing felt in the course of the larynx or trachea. If it extends into the bronchi, the patient experiences a sense of oppression or tightness across the chest, with more marked cough, wheezing, and the other signs of this condition. In many cases partial deafness is noticed, owing to implication of the Eustachian tubes; and the senses of taste and smell are generally impaired or lost. Should the alimentary canal be involved, this may be indicated by soreness along the œsophagus during deglutition; pain and tenderness over the epigastrium; complete anorexia; nausea or vomiting; and diarrhœa. Occasionally a slight degree of jaundice is observed.

Catarrh assumes different degrees of intensity, but the symptoms generally increase in severity for two or three days, and then gradually diminish. The nasal discharge becomes more abundant, being often very profuse, and it alters in its character, assuming a mucous or muco-purulent appearance. Not uncommonly the mouth becomes sore, and herpes appears about the lips; the nostrils are also often a little ulcerated. The patient generally feels worse during the night, when the painful sensations increase, and consequently sleep is liable to be much disturbed. Usually complete recovery is established in a few days, once convalescence sets in; but in some instances certain symptoms remain for a variable period, especially general debility, loss of appetite, cough, or impairment of the sense of smell or taste. Moreover, some more serious affection may be set up, particularly bronchitis or other disease of the respiratory organs. A simple cold is most in danger of leading to these results in very young or old persons, in those who are constitutionally feeble and delicate, or in those who are depressed by excessive mental or bodily work.

Diagnosis.—The symptoms of catarrh are readily recognized. but care must be exercised in discriminating between those cases which are simply due to a cold, and those in which the phenomena are associated with some other condition, especially with measles or epidemic influenza.

Prognosis is generally favorable, and the circumstances which render catarrh more than usually serious have already been indicated. It must be remembered that attacks of this complaint are very liable to be repeated, and even to become habitual at certain seasons.

Treatment.—It is the safest plan for any one who is suffering from a cold to stay in bed for a day or two at the outset, if this is practicable, or at any rate to stop indoors, in a warm and comfortable room. Undoubtedly its effect may often be alleviated or prevented by immediately exciting free sweating. For this purpose a warm bath or a foot-bath is useful, the patient going immediately afterwards to bed, and having some hot drink, such as gruel, wine-negus, spirit and water, or one of the other drinks ordinarily employed for this purpose. Certain medicines are also useful, of which the most efficient are a saline draught with spirits of nitre ; or a full dose of Dover's powder. A vapor, hot-air, or Turkish bath often proves of signal service in checking a cold at its commencement. Local applications have been much employed for this purpose, especially in the form of dry inhalations of iodine and other agents ; and of combinations made into snuffs, which are sniffed up into the nostrils. Ferrier recommends a snuff composed of hydrochlorate of morphia gr. ij, nitrate of bismuth ʒ vj, and powdered acacia ʒ ij, of which from a quarter to a half may be used in the twenty-four hours. Recently it has been affirmed that the prolonged mastication and swallowing of a dried leaf or two of the eucalyptus globulus has proved very efficacious in curing a cold.

If the complaint does not yield at the commencement, the patient should certainly remain in bed, and be kept on a light diet. Some practitioners lay special stress on limiting the amount of liquids given, or even withholding them altogether. With regard to medicines, these must be varied according to circumstances. Generally it is sufficient to open the bowels, and to give a saline mixture, to which a few drops of ipecacuanha wine may be added if the air-passages are much affected, as well as some sedative to relieve cough if this is excessive. Should there be much sickness, effervescents are useful ; and it may become necessary to administer remedies for the purpose of checking diarrhœa. Some narcotic may be required at night in order to procure sleep and relieve pain. If there is much debility and depression, quinine is a valuable medicine. As the patient tends towards convalescence, the diet should be improved by degrees, and a little wine may be given with advantage at this time. Complications must be watched for, and treated according to their nature. During convalescence tonics are very useful. If recovery is retarded, as well as in cases where attacks of catarrh are of frequent occurrence, a change of air to some genial district or climate is of the utmost benefit.—FREDERICK T. ROBERTS.

COUP DE SOLEIL—*See Sunstroke.*

COW POX.—*Definition.*—An acute infectious vesicular disease of the cow, communicable to man, and which has the effect of protecting the latter from attacks of small-pox.

Symptoms.—With the disease in the cow we have here no concern, and therefore shall only describe the rash produced in the human subject by the inoculation of the cow-pox in a person who has not previously been vaccinated. If a puncture be made in the skin of such a person with a lancet, and the vaccine matter be inserted with care, after two days, during which nothing appreciable occurs, a papular elevation is produced. On the fifth or sixth day this becomes a pearl-colored vesicle of a round or oval form, depressed in the centre and with its edges raised. On the eighth day the vesicle is more distended, but the depression in the centre still remains. On the seventh or eighth day a red ring is formed round the vesicle, which may be two or three inches in diameter. The redness fades on pressure, but the area is harder and more tender than the surrounding skin. About the tenth day the redness begins to disappear, and the lymph in the vesicle is seen to become thick and purulent, while the umbilication is less marked. At the end of a fortnight a scab forms, which remains adherent till about the end of the third week, when it falls off, leaving in its place a somewhat circular depression, which is foveated. These pits correspond with the cells of the vesicles. The cicatrix contracts somewhat, but otherwise, as a rule, remains for life.

Two or three days after the operation considerable itching of the part is experienced, and about the seventh or eighth day there is usually, especially in young children, some amount of constitutional disturbance, such as shivering, loss of appetite, and general *malaise*. At this period the temperature is somewhat slightly increased; sometimes also the axillary glands become enlarged.

Although this is the course of by far the majority of the cases of vaccination, some are, from time to time, found which do not run through quite the same symptoms as described above. Thus, occasionally a rose rash (*roseola vaccinia*) makes its appearance between the third and eighteenth day after inoculation, commencing most often in the neighborhood of the irritation and extending over other parts of the body. This rash consists of very slightly raised spots of a red color, varying in size from a quarter of an inch to three or four inches in diameter. It lasts but a day or two, and is not followed by desquamation or deposit of pigment.

In Variola vaccinia herpetica a crop of vesicles appears on the third day after the operation, and is preceded by an attack of shivering. They soon burst; the fluid which escapes irritates the adjoining skin, and an eczematous condition of the part is produced, the skin becoming hard and œdematous. Intense itching accompanies this outbreak, and the axillary glands often become enlarged.

In Variola vaccinia bullosa a bulla of various size, with a red edge, takes the place of the ordinary vesicle. It contains a clear liquid, which soon escapes, leaving a crust, which is shed without producing a scar, unless ulceration takes place, when the cicatrix is of considerable size.

In Variola vaccinia furunculosa red tubercles are formed, which subsequently suppurate.

Occasionally Erysipelas appears about the seventh to the tenth day round the vesicle, and spreads over the arm. It does not differ from ordinary erysipelas, and is accompanied by œdema, pain, and considerable constitutional disturbance. In some cases the pustules, instead of drying up and forming scabs, burst and ulceration takes place. The ulcers are attended by itching, pain and constitutional disturbance. This condition rarely results from lymph which has passed through the human subject, but occurs more frequently after inoculation direct from the cow.

But one other variety has to be described—that in which perfect vesicles are never developed, but scabbing occurs after a little fluid has been formed. It may be well also to mention that revaccination produces vesicles the typical characters of which are less marked, appearing earlier and running a more rapid course than in primary vaccination.

Vaccino-syphilis will be noticed under "Syphilis."

Prognosis.—A favorable result always follows vaccination, except in the rare cases when erysipelas occurs among young children.

Treatment.—Vaccination requires but little treatment. The vesicles should be carefully protected from injury, and oil should be applied to allay the itching. On the eighth day, if the vesicles be much distended, a few punctures into them is useful to relieve tension. If there should be any tendency to retention of pus or ulceration beneath the scabs, they *should be removed by a poultice, and the* wound treated according to the rules for treating ulcers. If the erythema be great, or if erysipelas occur, the arm should be kept in a sling and lotio plumbi applied to the part.

Finally, it should be borne in mind that lymph should never be taken, for the purpose of vaccination, from any but a perfect vesicle, with a proper areola, in the person of a healthy child vaccinated for the first time.—MALCOLM MORRIS.

COXALGIA—*See Hip Disease.*

CRAMP, Writer's (Scrivener's Palsy)—*See Paralysis, Local.*

CRETINISM.—*Natural History.*—Cretinism implies a condition of imperfect development and deformity of the whole body, especially of the head. It is endemic in the valleys of certain mountainous districts, attended by feebleness or absence of the mental faculties and special senses, and is often associated with goitre. The condition of idiocy named cretinism (and associated with goitre in many districts) is of great interest; but the relations of the two are not yet clearly understood. The idiocy of cretinism is associated with deformity and imperfection of the bodily organs, the brain, in common with other parts, participating in the imperfection and deformity. The affection of the mind varies from mere obtuseness of thought and purpose to the most complete obliteration of all intelligence.

Three varieties are to be distinguished:

"(*a.*) COMPLETE CRETINISM — synonym, INCURABLE CRETINISM.—Cretinism characterized by idiocy, deaf-dumbness, deficiency of general sensibility, and absence of the reproductive power.

"(*b*) SEMI-CRETINISM.—A degree of cretinism in which the mental faculties are limited to the impressions of the senses and the bodily wants; the general sensibility is obtuse, the head is badly formed and drooping, the speech is rudimentary, and the reproductive powers are feeble or absent.

"(*c.*) INCOMPLETE CRETINISM — synonym, CURABLE CRETINISM.—A degree of cretinism in which the mental faculties, though limited, are capable of development; the head is moderately well formed and erect, the special senses, the faculty of speech, and the reproductive powers are present."

With but few exceptions, cretins are goitrous; and it has been said that when both parents are goitrous for two generations in succession, the offspring, being the third generation, are sure to be cretins (Watson).

Treatment.—The indications of treatment are those which suggest improvement in all hygienic measures for the prevention of the disease. Once established, the condition of the cretin can only be ameliorated by institutions similar to those founded by Dr. Guggenbuhl of Zurich. The condition is beyond medicinal remedies.—WILLIAM AITKEN. *See also article on Idiocy, &c.*

CROUP.—*Natural History.*—This disease is a non-infectious inflammation of the mucous membrane of the trachea, occurring in children, differing from other inflammations in like tissue in the presence of plastic exudation of a fibrino-albuminous material, which rapidly coagulates upon the mucous membrane of the epiglottis, glottis, larynx, or trachea, and sometimes over all of these points; indicated by accelerated, difficult, wheezing, or shrill respiration; short, dry, constant, barking cough; voice altered by hoarseness, with spasm of the interior laryngeal muscles, and pain and constriction above the sternum, frequently followed, towards the close of the disease, by expectoration of a membranous albuminous substance, or even of a cylindrical cast of some portion of the breathing tube. The disease occurs in children, and many terminate fatally either in suffocation or exhaustion of the vital powers. Thus the most remarkable pathological phenomena of croup are to be observed in the exudative process which attends the inflammation in the windpipe, and the formation of a false membrane, almost peculiar to children, but sometimes seen in adults. The disease derives its importance from the tendency of the inflammation to attach itself to the opening of the glottis. In childhood the trachea is the chief seat of the inflammation; and when the larynx and the fauces are involved, they are so secondarily, and to a less degree. The croupous exudation rapidly coagulates when it is thrown out upon the free surface of a mucous membrane, involving in its lesion the epithelium only, so that when the croup-membrane is detached, the epithelium is quickly reproduced. No loss of substance occurs in the mucous membrane itself and no scar remains after the membrane is removed or disappears. On the other hand, the diphtheritic process is characterized by the production of a similar fibrino-albuminous and rapidly coagulable exudation; but differs from croup in the exudation forming not merely upon the surface of the mucous membrane, but within its substance. It infiltrates the mucous and submucous tissue, and this interstitial exudation, as well as the swollen elements of tissue, exerts a pressure upon the blood-vessels which results in sloughing (diphtheritic) of a portion of the inflamed mucous membrane. A diphtheritic eschar is the result, and on its separation there is a loss of substance and a consequent cicatrix. Every now and then discussions arise as to whether or not croup exists as distinct from diphtheria; and the essential qualities of the two diseases are often in dispute. Any one who has seen much of croup in children can have no difficulty in recognizing it as a disease very different from diphtheria in its attack, its course, and its results. A transition from croup to diphtheria is, however, not unfrequent when the malady forms part of, or occurs during the course of such acute infectious diseases as measles, small-pox, typhus, scarlet-fever, or during an epidemic of diphtheria.

Croup may be ushered in by sore throat, catarrhal symptoms, or a short dry cough, and may occur without the general health being sensibly impaired. The attack commonly takes place during the night, the sleep of the child, which was perhaps more or less agitated, being interrupted by fits of hoarse coughing. These become more frequent, the respiration more difficult, and marked by a peculiar wheezing, which has been described as like the sound of an inspiration forcibly made with a piece of muslin before the mouth, or like to the sound of air passing through a brazen tube. The little patient also feels a sense of restriction about the throat, as shown by carrying the hand often to it, grasping the larynx, or passing its fingers into its mouth, as if to pull away something which obstructs the passage.

By the end of the second or third day, sometimes sooner, the tongue becomes white, the heat of the body increased, the pulse frequent, the face flushed, and the countenance distressed. From this point the disease now rapidly advances, and the croupy sound, comparable to the noise which a fowl makes when caught in the hand, attains its height.

Diagnosis is generally between croup and the following diseases—namely, the different forms of sore throat, as the scarlet fever and measles, diphtheria, bronchitis, chronic laryngeal and tracheal inflammation, and hooping-cough; and the differential symptoms of each of these from croup must be studied by comparing the definitions, symptoms, and course of each of these diseases, as well as scarlet fever, measles, diphtheria, and whooping-cough. In diphtheria there is a specific fever, and the lesion spreads from above downwards, or may commence in the larynx. In croup the lesion commences in the trachea, and spreads upwards. Acute laryngitis is a disease of adult life, and croup is a disease of childhood.

Treatment.—Every case of croup demands the most active, efficient, and energetic treatment. When the exudation extends to the larynx, the course of the disease in children is so rapid and so fatal that the measures for its suppression must be early. Bleeding, and especially local bleeding, should be employed, and in most cases to a considerable extent. Two to twelve leeches, according to the age of the patient, should be applied over the larynx, and the bleeding should be encouraged by the application of a linseed poultice to the throat, As soon as some relief is obtained, a blister should be applied along the lateral aspect of the neck on each side, and not over the trachea. Emetics effect large evacuations, and favor the resolution of the inflammation; while the effort of vomiting may be the means of detaching and of expelling the false membrane, should it have formed. If relief does not ensue on the action of the emetic, two, three, or four grains of calomel, with two or three grains of James's powder, are to be given every two or three hours; and a dose of castor oil occasionally, till the full effect of the calomel as a purgative is obtained. Green fæcal stools, like chopped spinach, are characteristic results of these medicines. Expectorant medicines, ipecacuanha and seneca, should be given with the mercurials, and to be continued after them. Five-grain doses of iodide of potassium every two hours, and of chlorate of potassa have, been used with benefit; and the use of a vapor bath from 75° to 80° Fahr. is not to be neglected.

The medical treatment of croup is so frequently unsuccessful that tracheotomy is called for as the means of prolonging life, and as affording an additional chance of the patient's recovery. The evidence also is daily accumulating which shows that tracheotomy, as a remedy for croup, ought to be resorted to much oftener than it has hitherto been, and that at a much earlier period in the disease—not as a last resource, when death from asphyxia appears imminent, and after treatment of the most depressing kind. In country districts, indeed, the performance of tracheotomy in a case of croup is almost imperatively called for in the majority of cases, if some symptoms of amelioration do not follow the steady use of bleeding, emetics, the warm bath, and calomel purgation, pursued for twelve or sixteen hours.—WILLIAM AITKEN.

CROUP, Spasmodic—*See Laryngismus Stridulus.*

CUT-THROAT.—Usually suicidal.

Position.—Generally opposite larynx, which it of course opens, unless the wound be superficial.

Dangers.—(A, immediate) 1, hæmorrhage; 2, suffocation by blood-clot; 3, suffocation by a displaced solid structure; 4, entrance of air into a divided vein. (B, secondary) 1, exhaustion; 2, erysipelas; 3, abscess; 4, some form of blood-poisoning; 5, bronchitis or pneumonia; 6, secondary hæmorrhage, especially such as might be provoked by the patient tearing the wound open afresh. (C, remote) 1, cicatricial stenosis; 2, fistula.

Prognosis.—When a large vessel is wounded, death is usually almost immediate. In other cases the prognosis would be hopeful, but for the unfavorable state of body and mind usually coexisting in suicides.

Treatment.—1, Arrest hæmorrhage; tie bleeding vessels; 2, extract clots from air-passages; 3, if the injured parts cannot be brought into apposition without sutures, and if these sutures will not interfere at all with drainage, use them. In most cases sutures are not necessary; place a bandage round the head and another around the chest, and connect these in such a manner as to hold the chin down towards the chest; 4, in cases where the injury is such as to seriously obstruct breathing through larynx, perform tracheotomy; 5, dress the wound with a mass of antiseptic gauze (of course, this is not meant to keep the wound aseptic); 6, the patient must be diligently fed, and if, from wound of the œsophagus or damage to the larynx, swallowing is impossible or difficult, a tube must be passed down the gullet and food passed through it. Be sure not to pass this tube into the trachea by mistake, a blunder easily made ; 7, see that the nursing is diligent, energetic and vigilant.—C. B. KEETLEY.

CYANOSIS is a bluish discoloration of the skin arising in connection with malformation of the heart, such malformation being usually due to permanence of the foramen ovale, or to abnormal apertures in some part of the auriculo-ventricular septa, or to the origin of the aorta and pulmonary artery from a single ventricle, or to permanence of the ductus arteriosus. When such patients survive they suffer from coldness of the body, palpitations, dyspnœa, syncope, congestions, and dropsies. Of 186 cases collected by Dr. Lewis Smith, 67, or more than one-third, died before the close of the first year, 121, or more than three-fifths, before the age of ten ; only 21 survived the age of twenty, and 4 the age of forty years.

The mode of death in the majority of cases appears to be a sudden paroxysm of dyspnœa. Convulsions, especially in infants, hæmorrhage, and coma, are also common terminations. It is remarkable, as disproving any antagonism between cyanosis and heart disease generally and tuberculosis (in which antagonism even Rokitansky has declared himself a believer) that in 13 per cent. of Dr. Lewis Smith's cases, tuberculosis was present, and in several the lungs actually contained cavities.

Treatment must be, of course, palliative, nourishing diet, warmth of climate, and of clothing ; avoidance of fatigue and excitement, in addition to which something may be hoped for from posture ; that in which dyspnœa is most avoided being adhered to, or instantly resorted to when paroxysms threaten. Usually the child should be placed on the right side on an inclined plane of from twenty to thirty degrees, the head and shoulders of course in the highest part of the incline. The child should then be left alone for several hours if necessary, until the livid tint, the dyspnœa, and the tendency to convulsive twitchings pass away. This position on the right side gives the feeble and over-burdened heart the freest space for its movements, and the gentle elevation tends to relieve the dyspnœa. The child must be fed from a tea-spoon or suck some soft material soaked with breast-milk. A few drops of brandy may be given every two or three hours, and perfect quietness ensured.—E. ELLIS.

CYNANCHE
CYNANCHE MALIGNA } *See Diphtheria.*

CYNANCHE PAROTIDEA—*See Mumps.*

CYSTITIS.—*Etiology.*—The causes of vesical catarrh are : 1. Direct irritation, especially by calculi and morbid growths; or resulting from certain conditions of the urine, as after taking excess of cantharides, copaiba, beer or spirits, but particularly when this fluid becomes ammoniacal as the result of retention from some impediment to its escape, or from paralysis of the bladder in consequence of spinal disease. 2. Extension of inflammation in the vicinity, especially that of gonorrhœa. 3. Exposure to cold or wet. 4. Acute exanthemata occasionally.

Anatomical Characters.—Acute cystitis is characterized by redness, swelling and softening of the mucous membrane, with the formation of excess of mucus, and the detachment of epithelium with numerous young cells. In the chronic form the color becomes often dirty gray or brown, and there is thickening of the tissues, with, in time, hypertrophy of the muscular coat of the bladder, the walls becoming much thickened and tough. Abundant muco-purulent or purulent matter forms in the bladder, and th surface may ulcerate or even become gangrenous, or suppuration betw the coats may take place, ending in extensive destruction and structural changes. The urine is generally decomposed and ammoniacal. This has been supposed to be the result in some cases of an alkaline fermentation set up by the mucus formed in the bladder. Niemeyer and others, however, have advanced the opinion that this decomposition is generally the consequence of the repeated use of dirty catheters, by which low vital organisms are introduced into the bladder.

Symptoms.—The prominent symptoms of acute cystitis are uneasiness and a sense of heat over the bladder, in the perinæum, and along the urethra; in some cases tenderness over the hypogastrium, constant inclination to micturate, and a difficulty in retaining the urine, a few drops being passed, causing great pain and a sense of burning; and the presence of more or less mucus in the urine. There may be some degree of pyrexia. The chief indication of chronic cystitis is derived from the character of the urine, which contains much mucus and epithelium, or pus; or sometimes blood; and if the urine is ammoniacal, the pus is converted into a gelatinous, ropy, adhesive substance, which can only be poured with difficulty from one vessel into another, and may be drawn out into strings. After awhile much constitutional disturbance is often excited, with a tendency to hectic fever, and if extensive suppuration or gangrene should be set up, low typhoid symptoms are liable to arise, or those indicative of peritonitis may supervene.

Treatment.—In the first place the cause of cystitis must be removed, if possible, especially when this is in the form of a local irritant. In acute cases warm baths and hot fomentations or poultices over the hypogastrium, to which opium may be added, are of service. In some instances removal of blood, by means of a few leeches, is advisable. The bowels should be kept well opened, for which purpose enemata may be employed. Suppositories of opium or belladonna may be valuable for relieving the local sensations. Barley-water and similar drinks should be allowed freely, and citrate of potash administered, well diluted, along with tincture of henbane or opium.

In chronic cystitis it is important to see that the bladder is properly emptied, and should a catheter be required, care must be taken that this instrument is quite clean, and it may be well to smear it over with some antiseptic. If there is irritability of the bladder, liquor potassæ or the bicarbonate or a vegetable salt of potash should be given freely diluted, and the salts may be combined with tincture of hyoscyamus. Repeated warm baths are serviceable, or local fomentations may be employed. Stimulants must be avoided, and diluent drinks given freely. Should there be a catarrhal condition of the bladder, attended with the formation of much mucus or pus, it may be desirable to wash out this organ with warm injections containing some antiseptic, or with very dilute astringent or acid injections. Under these circumstances the best internal remedies are dilute nitric acid, with decoction of pareira, buchu, or uva ursi, and tincture of henbane; or balsam of copaiba with liquor potassæ.—FREDERICK T. ROBERTS.

CYSTOCELE.—*Definition.*—The anterior wall of the vagina, together with the bladder, descends so as to form a bulging swelling in the vagina, or even protruding from the vulva.

Causes.—Relaxation of the anterior vaginal wall, stone, ruptured perineum.

Symptoms.—Difficulty of micturition; the bladder being incompletely emptied; the remaining urine becoming decomposed and ammoniacal; vesical catarrh, pain, heat, tenesmus.

Signs.—A sound passed into the bladder reveals the presence of that organ in the prolapsed swelling.

Diagnosis.—From enterocele (*vide*).

Prognosis.—Generally favorable.

Treatment.—Palliative measures are local astringents in slight cases; support by pessaries. Cure is only affected by operation, by elytrorrhaphy (*elutron*, vagina, *raphe*, suture), by episeiorrhaphy (*episeion*, labium, *raphe*), or perineorrhaphy. The operation of elytrorrhaphy as recommended by Sims, consisting in denuding a sufficient portion of the anterior vaginal wall, either by dissecting off an oval portion, extending from half an inch behind the urethral orifice to near the cervix uteri, and bringing the edges together by sutures from side to side or antero-posteriorly; or the vaginal wall may be separated from the bladder by the method described by Thomas, and the fold being clamped, it is then cut off and sutures introduced.

Or the operation may be performed as recommended by Stolz.

The results of episeiorrhaphy are not good. The operation of perineorrhaphy is usually required in cases both of cystocele and rectocele.—HEYWOOD SMITH.

CYSTOMATA
CYSTS } *See Tumors.*

DANDY FEVER.—*See Dengue.*

DELHI BOIL.—*Definition.*—A chronic endemic disease met with in India, characterized by the production of a small flattened nodule, which undergoes slow ulceration and heals with loss of substance, leaving a whitish depressed scar.

Symptoms.—Delhi boil is said to begin as a small reddish spot with a central papule, gradually enlarging to form a smooth reddish-brown, flattened nodule, which then begins to desquamate and ulcerate. Yellowish-white points, which are the altered hair and gland follicles, soon become covered with a thin scab, under which suppuration slowly goes on. An indolent sore, with hard edges and base of flabby granulations, is present under the scab. After lasting two or three months the sore usually begins to heal, and leaves a whitish, irregular scar.

The disease attacks the exposed parts of the body, and does not seem materially to affect the general health. It is said to be communicable by inoculation.

Treatment.—Local treatment only is necessary, consisting in the thorough application of strong nitric acid if the nodule be in an early stage, or of potassa fusa if an ulcer have formed, which converts the disease into a simple ulcer that soon heals.—MALCOLM MORRIS.

DELIRIUM TREMENS, though usually arising from prolonged and excessive drinking, is not unfrequently produced by a wound or compound fracture acting as an exciting cause in patients who have not lately been guilty of great excess. Accessory causes are abstinence from food and any other depressing influence.

Pathology.—"The striking appearance," *post mortem*, "is that of excessive serosity" in the ventricles of the brain and between its membranes.

Symptoms.—Tremor, especially observable in the hands and tongue. Wandering of the mind, usually limited to delusions about certain things, *e. g.*, the patient knowing perfectly well where and with whom he is, yet fancies there is a demon or some noxious animal in the corner of the room, or following him about from place to place. His mind is ever recurring to these fancies, and he frequently talks about them and insists upon taking measures to escape from his imaginary enemies; his delerium is a fussy, "busy" one; he is always in a state of dread, and is often inclined to suspect his friends of harboring designs against him. In his active anxiety to escape from these he may do himself or even bystanders *some injury. Hands unsteady.* Tongue not only tremulous, but coated, usually with a creamy fur. Bowels confined. Breath foul, frequently alcoholic. No appetite. Sleeplessness, which has usually existed as a premonitory symptom before the delirium sets in.

Diagnosis.—From (1) acute mania, (2) meningitis, (3) delirium of fevers. Note the coolness and moisture of the skin, absence of fever and very likely of pain in the head. In the continued fevers prostration has probably preceded the delirium, but thermometric observations and a consideration of the history (which is, unfortunately, not always easy to get), should settle the diagnosis. There is something very characteristic about the manner of the delirium in delirium tremens.

Prognosis.—If sleep can be quickly procured, good. If not, and especially if the tongue gets brown and dry, bad.

Treatment.—Indications (1) to procure sleep, (2) to keep up the strength. Watchful, firm, and gentle, good-natured nursing. Milk, strong beef tea, and small quantities of nutritious solid food, if it can be borne, at frequent intervals. Stimulants should either be forbidden altogether or else allowed only in small quantities at a time, and then only on condition that food be taken with each draught. Beer is the best stimulant in these cases. A dose of calomel (5–10 grains) justifiable at first. Morphia subcutaneously. Hydrate of chloral (30 grains) repeated in two hours and then in another three hours. Digitalis in large doses has been recommended. Mr. Holmes' remarks on treatment of delirium tremens in his treatise are very clear and instructive.—C. B. KEETLEY. *See also Alcoholism.*

DEMENTIA.—A disorder of the intellect characterized by loss or feebleness of the mental faculties is expressed by dementia. The deterioration of mental function extends from failing memory and slight confusion of thought onwards to utter fatuity. Some dements have previously suffered from melancholia. Some have been maniacal; others have suffered from the severe delirium of fever or sunstroke, but after a partial recovery from these immediate affections, by slow gradations the mental faculties become dull, confused and finally obliterated. Others, again, lose their faculties by reason of extreme old age—senile dementia. Feebleness is the essential characteristic of this form of intellectual disorder, and there is abolition, more or less marked, of all the sensitive, intellectual and voluntary faculties. If dementia is long continued its outward signs are—a vacant and puzzled look, a lack-lustre eye, a weak smile, a meaningless laugh. Dements may become paralytic, a thickness of speech being the first symptom of its approach, followed by a loss of power in the limbs of one side, more marked in the lower extremity, so that the step is feeble and straggling. In the last stage they may present the phenomena of paralysis of the insane, which see.—WM. AITKEN.

DENGUE.—*Natural History.*—A continued fever, or febricula, characterized by sudden severe frontal headache, and by severe pains in the limbs, small joints, and in the trunk; and sometimes by an eruption resembling that of measles. The disease is more peculiar to the East and West Indies and America; but has been seen in Spain and other European countries. The attack of dengue is sudden—almost to a minute. The patient may go to bed, apparently quite well, and wake up about two or three in the morning with a hot skin—so hot that in a few hours the temperature in the axilla ranges from 99° to 103° Fahr., a pulse varying from 78 to 108, and a countenance indicative of utter helplessness and prostration. The fever is peculiar in the numerous daily remissions and exacerbations. Very often the first symptom is pain in the head, back, limbs, and small joints (which swell), with a feeling of faintness, giddiness, and weariness, so that the desire to lie down is overpowering. From the peculiar affection of the joints, the fever has been described as "arthritic." There may be a tendency to shiver, and in some epidemics distinct rigors, with hysterical symptoms in women and also in men, and convulsions in children. The average duration of this first febrile stage is about forty-eight hours (extremes, twelve hours to three or four days), when the symptoms begin gradually to subside · and a period of remission, of two to three days, occurs. During this period, general debility and muscular pains predominate, but without fever. On the fourth day there is generally a slight return of fever: and on the fifth or sixth day an exanthematous eruption appears, more like erysipelas than the eruption either of measles or scarlet fever. The color, however, is not so intense, and spreads over the whole body in forty-eight hours. The eruption is always most marked on the palms of the hands and soles of the feet; and beginning on the head and face, passes downwards.

When the eruption reaches its maximum, painful swellings of the lymphatic glands of the neck and occiput, axilla and groins, are common, and sometimes also of the testicles. According to Dr. Christie, of Zanzibar, the occipital glands invariably swell. With the swelling of the lymphatics, the mucous membrane of the mouth, nose, and throat becomes implicated —varying from mere redness to an extensive aphthous eruption, with considerable tumefaction of the lips and nose, conjoined with excessive pain—the mucous membrane becoming raw. The condition of the tongue varies greatly—generally it is coated, and with large papillæ. On the seventh or eignth day desquamation commences, and the acute stage terminates. The victims of dengue are to be commiserated for the horrible and agonizing pains peculiar to the disease; but they are also to be reassured by the fact that the disease is of a non-fatal nature. The recurrence of the excruciating pains in the limbs, at a period long after subsidence of the fever, ought to be held in remembrance of any prognosis as to the probable duration of the illness. Swellings of the lymphatic glands of the neck, axilla, and groins, occur in many cases.

Diagnosis.—This disease may be confounded with rheumatism, or scarlet fever, or erysipelas.

Treatment.—Purgation is generally called for at the outset only, and is not to be continued.

Rhubarb, soda, and calumba, or calomel, or colocynth, or these variously combined, are the most efficient remedies—to be followed by doses of quinine of five to ten grains.

When the febrile symptoms subside, iodide of potassium, in four or five grain doses, has a very beneficial effect.

Belladonna, in the form of tincture, in medium doses, repeated every hour, is of great service is subduing the pain. The effect of this remedy requires to be watched.—WILLIAM AITKIN.

DERMATITIS EXFOLIATIVA—*See Pityriasis Rubra.*

DERMATOLYSIS.—*Definition.*—Dermatolysis is a growth of the skin, causing it to hang in folds.

Symptoms.—The disease may occur in any part of the body, but according to Alibert it most frequently attacks the eyebrows, face, neck, abdomen, and labia, and is due to a pathological change in the skin, causing an increase of the fibro-cellular tissue. The skin hangs in folds, but no other symptom is present beyond some loss of sensibility in the part.—MALCOLM MORRIS.

DIABETES INSIPIDUS.—*Pathology and Etiology.*—The etiology of diabetes insipidus is very obscure, but the complaint is probably allied to diabetes mellitus. The probable immediate cause of the excessive flow of urine, which is one of the chief characteristics of the complaint, consists in dilatation of the renal vessels, due to paralysis of their muscular coat, resulting from deranged innervation. The condition can be induced experimentally by irritating a spot in the floor of the fourth ventricle immediately above the auditory nuclei, by section of the great splanchnic nerve, by section of the sympathetic trunk in the chest above the origin of the splanchnic nerves, and by section of the vagus nerve and electrization of its peripheral end. It has also been attributed to injury of the nervous centres, especially resulting from blows inflicted on the front of the skull, so that the posterior part of the brain was injured; to injuries affecting the sympathetic trunk; to organic diseases of the brain and cord, such as gray degeneration of the floor of the fourth ventricle, meningitis, and growths in the brain; to pressure upon the splanchnic nerves, the solar plexus, or the pneumogastric nerves by tumors or aneurisms; to depressing emotions; and to hysteria, neuralgia, and other nervous disorders. The lesions in the brain have nearly always been found in the cerebello-medullary region. Among other alleged causes should be mentioned exposure to cold, drinking cold water when the body is heated, excessive drinking of alcoholic liquids, violent effort and muscular strain, and previous febrile or inflammatory attacks. The complaint is much more common in children than in adults. It is occasionally hereditary, or diabetes mellitus may have existed in the parent.

Symptoms.—This affection is characterized by great thirst, with an increased flow of urine, which is watery and usually of a low specific gravity, but does not contain any sugar or other abnormal ingredient. The quantity of urine discharged may be enormous, sometimes exceeding considerably the amount of fluid taken into the system, and the proportion of solids discharged in the twenty-four hours may be normal, excessive, or below par. Usually they are in excess, especially the urea, and occasionally a condition of so-called azoturia is present. Frequent micturition is often observed. Patients suffering from diabetes insipidus have been sometimes known to drink their own urine if their drink was restricted. Occasionally they enjoy excellent health, but more commonly present more or less of the symptoms which are noticed in diabetes mellitus, especially a dry and harsh skin, loss of flesh, weakness, sensitiveness to cold, and dryness of the mouth. In most cases the appetite is not excessive, but sometimes it is voracious. Epigastric pains and constipation are often complained of. As a rule diabetes insipidus is chronic in its onset and course; occasionally it sets in suddenly. Recovery is extremely exceptional, but death usually results from some organic complication. Occasionally the fatal termination is preceded by progressive wasting and exhaustion, total anorexia, diarrhœa, and vomiting.

Treatment.—Opium, valerian, camphor, nitrate of potash, iron, iodide of potassium, arsenic, belladonna, bromide of potassium, and dilute nitric acid are the chief medicines which have been recommended in the treatment of diabetes insipidus. Withdrawal of liquids from the diet has not proved successful. The use of the constant galvanic current, applied over the hypochondrium, or to the neck and spinal column, has been advocated. The general health and digestive functions must be attended to, and symptoms treated as they arise.—FREDERICK T. ROBERTS.

DIABETES MELLITUS.—*Pathology and Etiology.*—The pathology of diabetes is still very uncertain, and it is difficult to determine the class of diseases to which this complaint should be referred. Under these circumstances it may for the present be conveniently discussed among the constitutional disorders, as the general system is often profoundly affected in diabetes, although its phenomena probably depend upon derangement of a special function which is carried on in the body, and in many cases may be referred to a local cause of a definite character.

Before considering the pathology of diabetes it is requisite to offer a few remarks respecting certain physiological questions which have a bearing upon this complaint. In the first place, it has been conclusively proved that sugar is always present in the blood during life, no matter what the nature of the diet may be. Claude Bernard concluded from his experiments that in the normal state its amount fluctuated between from one to three parts per thousand, and that it is essential for the due maintenance of nutritive action, the sugar being used up in the process of nutrition. Further, this eminent physiologist believed that it can only be destroyed within certain limits, and that about three per thousand represents the limit of the capacity of the blood for sugar, beyond which amount it overflows through the renal organs, and is excreted with the urine. He also held that there is a marked difference between arterial and venous blood as to the relative proportion of sugar contained in each, the mean difference in several analyses representing about 0.300 part per one thousand excess in arterial blood. Dr. Pavy, however, who has recently again brought his views as to the pathology of diabetes prominently before the profession,* affirms that the experiments which led to these conclusions were fallacious, and that naturally the blood only contains a very small quantity of sugar, while the difference in the amount of sugar belonging to arterial and venous blood is insignificant.

With regard to the urine, it is generally believed that this fluid is perfectly free from sugar in the normal state. Pavy states that when sufficiently delicate tests are employed, it can be shown that healthy urine always does contain sugar in minute quantity; that a sufficiency to give a slight reaction under ordinary testing is not uncommon; and that sometimes as much as five to eight parts per one thousand may be present as an incidental occurrence. Consequently he maintains that there is no abrupt line of demarcation, or distinction of an absolute kind, between the urine of health and that of diabetes; and that the difference, as regards the urine, is one of degree and not of kind. The chief circumstances under which this temporary glycosuria may occur, so that the presence of sugar can be appreciated by the ordinary tests, are after taking food containing much sugar or starch; after the administration of chloroform; in poisoning by strychnine or woorara; in various conditions which interfere with respiration, such as during paroxysms of asthma or whooping-cough; in certain nervous diseases, for example, epilepsy, tetanus, or apoplexy; and in connection with injuries affecting the nervous system, the liver and other parts. Glycosuria can also be induced experimentally in several ways.

The next question relates to the explanation of the presence of sugar in the blood and urine. As regards the blood, a certain quantity is probably taken up directly from the alimentary canal by the absorbents, and conveyed along the thoracic duct to the general circulation. Bernard, and those who agree with his views, account for the existence of sugar in the blood chiefly by the so-called glycogenic theory. This observer discovered that in health a substance is formed in the cells of the liver derived from the sugar which is absorbed by the bloodvessels from the alimentary canal, and conveyed by the portal vein into the liver. This substance is of an amyloid nature, and is capable of being readily converted into grape sugar; it has received various names, the chief being glycogen, amyloid substance, zoamylin, animal or hepatic dextrin or starch, and Pavy has suggested that it should be called Bernardin, after its eminent discoverer. It is further believed that a peculiar ferment exists in the blood which has the power of converting this glycogen into grape sugar. According to Bernard and his followers, this conversion is being constantly carried on in the liver in the normal state, the sugar being then conveyed by the hepatic vein into the circulation, and gradually undergoing combustion in the peripheral capillaries, especially in those of the muscles, being converted into water and carbonic acid, and contributing to force-production. This destruction of the sugar is supposed to account for the difference alleged to exist in the relative proportion of sugar contained respectively in arterial and venous blood. Bernard also affirmed from his experiments, that during life the liver contains from one to three parts per one thousand of sugar, derived from the glycogen. Pavy is strongly opposed to these views, and his theory is, that the liver is a sugar-assimilating and not a sugar-forming organ; that the sugar which reaches this organ is converted into and stored up as amyloid substance (he objects to the term glycogen), but that this material is not reconverted in the normal state into sugar; and that one of the functions of the liver is to detain and appropriate the sugar which passes through it, changing this element into a substance which can be afterwards used up in the economy, and preventing it from passing into the general circulation as sugar, which is incapable of utilization. He, moreover, maintains that amyloid substance can also be formed from nitrogenous matter, owing to a rearrangement of its elements, and this is in consonance with the recent views of some physiologists, who maintain that the liver is the organ in which urea is produced. As to the amount of sugar present in the liver, Pavy holds that this is very small, that the large proportion found by Bernard was due to post-mortem change, and that if the liver is frozen immediately after death only a minute quantity of sugar can be obtained from it. In this he is supported by many eminent experimenters in physiology. With regard to the sugar present in the blood in health, he affirms that it is not derived from any normal change in the glycogen, but that it is mainly either the excess of the ingested sugar which has not been appropriated by the liver, and has thus been permitted to reach the general circulation; or that it is derived from an unnatural change in the amyloid substance, which possesses a strong tendency to pass into sugar under the influence of contact with bodies of the nature of ferments. Dr. McDonnell has advanced the theory that hepatic dextrin is not converted into sugar at all, but that it unites with nitrogen to form a new protein compound resembling casein. Some authorities hold that the muscles form glycogen as well as the liver, and that in these structures conversion of this material into sugar takes place, as well as the destruction of sugar.

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* *Croonian Lectures, 1878.*

With reference to the presence of sugar in the urine in a state of health, according to the glycogenic theory this represents the excess of this element which is not destroyed in the system, whether in consequence of excessive ingestion or of undue production from glycogen, and which is therefore eliminated by the kidneys. The supporters of this view hold that only exceptionally and under particular circumstances does the urine give evidence of the presence of sugar within the limits of health. On the contrary, Pavy states, as has been already mentioned, that sugar is always present in minute quantity in the urine, corresponding to the amount existing in the blood; and he denies that it represents any excess over what is destroyed or that sugar is specially eliminated by the kidneys, but merely passes through the vessels of these organs by a process of diffusion, as it does through all the vessels of the body, and thus appears in the urine.

Another point bearing upon the pathology of diabetes is the connection which physiological experiments have proved to exist between the nervous system and glycosuria. Bernard discovered that by penetrating a certain spot in the floor of the fourth ventricle glycosuria may be induced. Subsequently Pavy ascertained, and his experiments have been corroborated by other observers, that the same result follows injury to certain portions of the sympathetic nerve. Thus sugar appeared in the urine when the filaments ascending from the superior thoracic ganglion to accompany the vertebral artery were divided, when the superior cervical ganglion was removed, and in some instances when the gangliated cord in the chest was divided. The influence of the nervous system in the production of glycosuria is generally believed to be exercised through the vessels going to the liver, paralysis of their walls being induced, with consequent dilatation; but some physiologists are of opinion that the nerves directly affect the amount of glycogen formed, and the rapidity of its conversion into sugar. With regard to the effect of the vascular paralysis, most authorities consider that it merely leads to a state of hyperæmia of the liver, in consequence of which a more intimate and speedy contact of the glycogen and ferment is brought about, and Schiff believed that a special ferment was developed under these circumstances. Pavy, however, has found experimentally that when defibrinated arterial blood is injected into the portal vein, marked glycosuria is induced, and this condition is also noticed when the blood generally is maintained at a highly oxygenated state, as when artificial respiration is performed, or carbonic oxide is inhaled. This authority maintains that these observations explain the relation of the nervous lesions to glycosuria, a state of vaso-motor paralysis of the vessels of the chylopoietic viscera being induced, which permits the blood to reach the liver through the portal vein without being properly de-arterialized, and it is the presence of oxygenated blood in this vein which causes the glycosuria, though in what precise way it acts he is not prepared to state, whether by interfering with the formation of amyloid substance, and thus allowing the sugar to pass through the liver unchanged ; or by facilitating the reconversion of the amyloid substance into sugar.

Having discussed these physiological questions, the main theories at present held as to the pathology of diabetes may now be enunciated.

1. According to Bernard and his followers diabetes consists in an increased formation of sugar in the liver from glycogen, in excess of what normally takes place; hence it accumulates in the blood, and is excreted by the kidneys. A modification of this view is that there is diminished destruction of sugar in the system, either of that normally formed, or along with excessive production. The muscles are also supposed to be at fault in some cases, and to assist the causation of diabetes.

2. Pavy's views are entirely opposed to those just stated. As previously remarked as regards diabetes, so far as the presence of sugar in the urine is concerned, as being a mere exaggeration of the condition observed in health, the difference being one of degree and not of kind. He holds that this complaint consists either in a want of assimilative power on the part of the liver over the saccharine principle, so that it is not appropriated and converted into amyloid substance, but is allowed to pass on into the general circulation ; or in an abnormal change of this amyloid substance into sugar, a change that does not take place in health. The excess of sugar in the blood is evidenced by the presence of a corresponding amount of urine.

3. Most observers agree that in a large proportion of cases at any rate some morbid condition of the nervous system is the primary cause of diabetes, and the modes in which such a lesion may be supposed to act have already been sufficiently discussed. This view is not only borne out by physiological experiments, but also by clinical observation and post-mortem examinations. The nature and seat of the morbid conditions are still matters of dispute, but doubtless they differ in different cases. Dickinson has described special lesions in the nerve-centres, which will be presently alluded

to. Pavy inclines to the opinion that some kind of textural change in the brain stands at the foundation of diabetes, and considers that this disease may arise in either of two ways, namely, from a lesion effecting or involving a loss of power in the vasomotor centres, with consequent direct paralysis of the muscular coat of the vessels; or a lesion in some part or other of the cerebro-spinal system, leading to an inhibitory influence being exerted upon these centres. This authority suggests an alliance betwen diabetes and locomotor ataxy or progressive muscular atrophy, as regards the progressive character of the disease.

It seems highly probable that the exact pathology of diabetes differs in different cases, and in the present state of knowledge at any rate no exclusive view can be adopted. At the same time there is every reason to believe that in a large proportion of cases the nervous system is primarily at fault, though the nature of the lesion may vary.

Exciting Causes.—The exciting causes of diabetes in individual cases are usually by no means evident. Among those to which the disease has been mainly attributed are exposure to wet and cold; drinking cold water when the body is heated; abuse of alcohol, sugar, and starchy substances; powerful emotional disturbance, or excessive mental work; injuries to the head, spine, and various other parts, or general concussion of the body; and organic diseases affecting certain parts of the nerve-centres or the sympathetic trunk. In some cases the disease seems to have followed the prolonged action of depressing mental causes, combined with influences which tend to impair the health, as, for instance, grief and anxiety with long continued watching over the sick; or worry and close confinement in business. Occasionally it has appeared to be the sequela of some acute febrile disease.

Predisposing Causes.—As regards predisposing causes, diabetes is most common in adults from twenty-five to sixty-five years of age, especially during the period of development and activity of the sexual functions; in males, after the period of puberty; and in persons residing in cities and manufacturing districts. In some instances there unquestionably appears to be some hereditary predisposition; or the disease tends to run in families.

Anatomical Characters.—There are no morbid appearances at present recognized as peculiar to .diabetes, but the most important lesions which have been observed are those associated with the nervous system. In some cases there is obvious organic disease, such as a tumor affecting the medulla or pons, or pressing upon the sympathetic trunk. In others minute microscopic examination is necessary in order to detect the pathological changes. Dr. Dickinson has described peculiar alterations in various parts of the nerve-centres, especially about the medulla and pons, in the way of dilatation of the arteries, followed by degeneration and destruction of the nerve-elements around the vessels, leading to the formation of excavations, which may be of some size. Other observers have, however, failed to detect any such changes after careful and minute examination in cases of diabetes of the most typical character, and Drs. Frederick Taylor and Goodhart have especially disputed the validity of Dr. Dickinson's conclusions. Most authorities deny that there is any special morbid condition of the liver, though some observers have described peculiar changes in its general or microscopic characters. The kidneys are often diseased, but this is a secondary result of the diabetes, the most frequent morbid state being some form of Bright's. disease. The lungs are also frequently affected, the lesion being usually a form of phthisis, but occasionally pneumonia of a low type or gangrene supervenes. The heart is generally small, and wanting in tone. There is a tendency to serous inflammations of a low type; and also to inflammation of other structures, ending in suppuration or gangrene. Hypertrophy of the pancreas is said to be comparatively frequent in cases of diabetes. The stomach is generally dilated, its mucous coat being thickened and softened, and its muscular coat sometimes hypertrophied.

Symptoms.—Clinically cases of diabetes differ remarkably in their severity, one class presenting but slight symptoms; another group being accompanied with marked local and constitution disturbance. In a typical example of the disease the symptoms may be arranged under the following heads:

1. *Urinary Organs and Urine.*—Micturition becomes more and more frequent, and the urine is increased in quantity. This fluid is also irritating in quality, and hence often causes in the male a sense of heat or burning along the urethra, or sets up slight inflammation, excoriation, or even ulceration about its orifice; while in the female the vulva is frequently much irritated, and may be the seat of troublesome itching. This may lead the patient to indulge in masturbation. Pain and tenderness are often felt over the region of the kidneys. The quantity of urine may amount to 8, 12, 20, or even 30 pints in twenty-four hours. It is usually very pale, clear, and watery, the more so in proportion to its quantity; possesses a sweet taste, and occasionally a sweetish odor; has a high specific gravity, this being generally about 1040, but it may range from 1015 to 1060 or more; ferments rapidly if kept in a warm place, with the formation of torulæ, at the same time becoming opalescent or depositing a sediment; while it yields more or less sugar to the usual tests. Many different statements have been made as to the proportion of urea and uric acid present in diabetic urine; probably these constituents are as a rule absolutely increased, but relatively to the water they are diminished. The quantity of water is generally about equal to that taken into the system. The amount of sugar discharged is greater after food has been taken, especially after such articles as contain much sugar or starch, being considerably less when the diet is restricted to animal food. In any pyrexial condition it becomes greatly diminished, or may even disappear altogether, and no glycogen is formed in the liver under these circumstances. The proportion of sugar usually present ranges from 8 to 12 per cent., and from fifteen to twenty-five ounces are discharged daily on the average; but the quantity may vary from less than an ounce to two pounds or more. The urine may contain albumen, or occasionally a little blood; it is also stated to yield fat sometimes, or to resemble chylous urine in its characters.

2. *Digestive Organs.*—A very constant, though not invariable symptom of diabetes is insatiable thirst, attended with a dry, parched, and clammy condition of the mouth and throat, due to the presence of sugar in the blood, which creates a demand for much liquid. In many cases also there is excessive appetite, but disinclination for food is not uncommonly observed. The tongue generally presents a peculiar irritable, red, clean, cracked, and dry appearance; it may, however, be moist and furred. Sponginess of the gums, with a tendency to bleeding and rapid destruction of the teeth are frequently noticed. The saliva contains sugar, and is said to be very acid sometimes, owing to the conversion of this sugar into lactic acid. The breath has in some cases a distinctly sweet or alelike odor; in most cases which end fatally with nervous symptoms it yields a smell resembling that of stale vinegar or stale beer (B. Foster.) Dyspeptic symptoms are of common occurrence, such as epigastric fulness or sense of sinking, flatulence, and gaseous or acid eructations. As a rule the bowels are constipated, with pale, dry, and spongy stools, but there may be diarrhœa or dysenteric symptoms, especially towards the close of a case.

3. *General Symptoms.*—The aspect of the patient is in many instances strikingly characteristic of diabetes, the prominent features being emaciation, often extreme, involving not only the fat but also the muscles, which feel flabby and soft; a peculiar dry, harsh, scurfy condition of the skin; and a distressed, worn, and suffering expression of countenance. The patient feels weak and languid, is often chilly, and is indisposed for any bodily or mental effort, at the same time complaining of pain and soreness or aching in the limbs. Slight œdema of the legs is frequently observed, and occasional dropsy affects other parts. Sometimes the temperature is markedly reduced, and in any pyrexial condition it does not become nearly so much elevated as it would otherwise be.. Sexual inclination and power are commonly greatly diminished or lost. The mental condition and disposition become usually much altered in established cases of diabetes, as evidenced by decline of mental vigor, disposition to lassitude or drowsiness, lowness of spirits, petulance and irritability, or decline in firmness of character and moral tone. Temporary dimness of vision is not an infrequent phenomena. The blood contains sugar, which is also found in the various secretions.

4. *Complications.*—Most of the complications of diabetes have been already alluded to in the account of its morbid anatomy, the most frequent symptoms coming under this head being those indicative of pulmonary phthisis. Here may also be mentioned the not uncommon occurrence of boils and carbuncles, of chronic skin affections, such as psoriasis, of gradual permanent blindness, from atrophy of the retina, and of cataract, the last being almost always of the soft kind, and attributed to imbibition of sugar, which, it is said, has been detected in the lens.

Course and Terminations.—The precise clinical history of diabetes varies much in different cases, as regards the intensity and exact combination of the symptoms just described and the rapidity of the progress of the disease. Ordinarily the course is essentially chronic, the symptoms setting in very insidiously, and becoming gradually but progressively worse. It may happen that for a considerable time the advent of diabetes is only indicated by slight general symptoms, such as debility, languor, and some loss of flesh. Occasionally the disease runs an acute course; or it may exhibit remissions from time to time, and may certainly be often materially influenced by treatment, in some cases a cure being effected. It is frequently observed that the symptoms are more intense at the early stage than subsequently. Most cases ultimately prove fatal, and towards the close the symptoms often change considerably in their characters, the urine and sugar diminishing in quantity, albuminuria setting in, there being complete disgust for food, and hectic or colliquative diarrhœa occurring. The fatal result usually arises either from gradual exhaustion, from blood-poisoning, leading to stupor ending in complete coma, or occasionally to delirium or convulsions, or from complications. Now and then death takes place suddenly, or with great rapidity. The cause of this rapidly fatal termination in cases of diabetes is not positively known. It has been attributed to uræmia, to some affection of the nervous or respiratory systems, to thickening of the blood, so that it cannot circulate, and to the chemical transformation of sugar within the body, leading to the production of poisonous compounds. Dr. Balthazar Foster* attributes it to the last-mentioned cause, and thinks that acetonæmia is the actual cause of the comatose condition. He is of opinion that all patients who are seriously diabetic have probably a small quantity of acetone formed in their economy, and under certain circumstances this rapidly undergoes great increase, and gives rise to the acute symptoms which lead to sudden death. He thinks it highly probable that alcohol is also formed in the system. Two cases terminating in this manner have come under my notice, and in one case the result was clearly traceable to suddenly cutting off the supply of water.

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* British Medical Journal, January 19th, 1878.

Diagnosis.—When diabetes is well established, there ought to be no difficulty in recognizing the disease. The urinary symptoms and characters of the urine, the symptoms referable to the alimentary canal, and the general condition are highly characteristic. The rule of always examining the urine carefully when the health is persistently out of order, and especially if there are the slightest symptoms suggestive of this complaint, will often lead to a diagnosis at an early period. If a patient complains of languor and debility, or is losing flesh without any obvious cause, if much irritation is experienced about the external genital organs, or if a child is detected masturbating, diabetes should always be borne in mind. The mere finding of a trace of sugar in the urine is not, however, evidence of the presence of diabetes. It must be in some quantity, persistent, and attended with polyuria. Seldom can any definite diagnosis be made of the exact morbid condition upon which diabetes depends. The possibility of a comatose condition depending upon diabetes must be borne in mind in any case of unconsciousness of which the cause is not evident. The smell of the breath and examination of the urine ought to clear up any difficulty in the diagnosis under such circumstances.

Prognosis.—Confirmed diabetes is a very serious disease, a large proportion of cases ending fatally, and their average duration is stated to be about from one to three years. In many instances, however, much improvement may be effected, and in some cases recovery can be brought about. The chief circumstances which influence the prognosis are age, the prospect being worse in very young than in old persons; the general condition of the patient, the disease being much less serious in stout individuals; the cause of the complaint, the amount of sugar and urine passed, the severity of the general symptoms, the presence or absence of complications, as well as their nature, the duration and progress of the case, and the results of treatment, as well as whether this is properly carried out. Any person suffering from diabetes should be particularly cautioned against exposure to wet and cold and other recognized causes of disease.

Treatment.—Cases of diabetes must necessarily call for much diversity in their management, and no case ought to be subjected to treatment until its nature and the conditions present have been ascertained as fully as is practicable; there are, however, certain general principles to be followed, to which attention will now be directed. At the outset it is most important to impress upon patients that they must be prepared to place themselves under strict discipline and guidance, and that much of the success of treatment will depend upon their own conduct.

1. The first indication almost universally recognized in the treatment of diabetes is regulation of the diet. The object aimed at is to prohibit, or to restrict within proper limits the consumption of such articles as contain sugar or starch, especially ordinary bread or flour, sugar in any form, honey, vegetables and fruits containing starch or sugar, namely, potatoes, peas, beans, carrots, turnips, parsnips, strawberries, raspberries, plums, gooseberries, currants, apples, pears, etc., rice, prepared varieties of starch, such as arrowroot, sago, maccaroni, tapioca, and vermicelli, shellfish, and the soft parts of crabs and lobsters. Animal food, including meat, poultry, game, and fish, should be the main diet, with the exception of liver. Dr. Lauder Brunton has suggested the use of raw meat, finely chopped, and mixed with pepper and salt. The chief substitutes for bread which are employed include bran cake or biscuits, gluten bread, almond rusks and biscuits, or very thin slices of bread toasted until they are almost black.

Eggs, butter, cheese, broths, good soup, and jellies are admissible, also vegetables not containing sugar or starch, such as cabbage, Brussels sprouts, broccoli, cauliflower, lettuce, cress, and celery.

The question of drink is one of much moment. Milk is theoretically contraindicated in diabetes, because it contains much sugar, but it has been found in some instances that when given in moderate quantities milk is not injurious, and may even prove highly beneficial. Therefore it is allowable to try the effects of a regulated amount of this article of diet in any individual case, being guided accordingly in its subsequent administration. The milk may be mixed with lime-water, or soda-water. Cream may be given in abundance, if it agrees with the patient. Dr. Donkin has advocated the treatment of diabetes entirely by skimmed milk, given in quantities of from six to eight or even twelve pints daily, and continued for several weeks if necessary, no other food or medicine being allowed. My experience of this treatment is anything but favorable, but I have found much benefit result from giving a considerably quantity of skimmed milk daily, as much as three or four pints, along with other food. Dr. Lauder Brunton has recommended the use of buttermilk. The balance of evidence is decidedly against the consumption of alcoholic stimulants to any considerable extent. A small quantity is frequently serviceable, those forms of stimulant being employed which are most free from sugar, viz., dry sherry, bitter ale, brandy or whiskey, well-diluted claret, and Burgundy. Tea and coffee without sugar may be allowed, and also cocoa made from the nibs, provided it agrees. It is not desirable to restrict the quantity of liquid too much, but it must be moderated so far as the feelings of the patient will permit. Most injerious is it to cut off the supply of liquids suddenly, and I have known a rapidly fatal issue result from this cause. Thirst may be relieved by iced water, by acid drinks, of which a solution of phosphoric acid has been much recommended, or by a solution of cream of tartar. Trout affirmed that tepid liquids relieved thirst better than cold. The Bristol Hotwells, Carlsbad, and Vichy waters are said to have some direct influence on diabetes, in addition to being serviceable as a drink, whilst the Carlsbad waters have also an aperient action.

It is highly important to attend to the following points in regulating the diet: 1. The change should be brought about gradually and not suddenly. 2. Frequent variations in the food should be made amongst those articles which are permissible. 3. In many cases it is necessary to watch carefully that the regimen laid down is strictly adhered to, especially at the early period of treatment, and among ignorant patients. 4. Every individual case must be studied for itself, and the advisability of persevering in the restricted diet or not must be judged by the results. In some instances, where there is much loathing of food, a little bread is often of great service. Again, if a fair trial of the recognized diet does not seem to lead to any improvement, or if the general condition is becoming worse, as may especially happen when the disease is far advanced, it may be desirable to let the patient follow his own inclination, guided by intelligence and common-sense sometimes also patients cannot possibly take the prescribed food, and then a mixed diet must be permitted.

Allusion may be here made to the saccharine treatment of diabetes, in which sugar and honey are administered in considerable quantities, any diet being allowed. This has been proved to be decidedly injurious in the majority of cases.

2. General hygienic management is highly important in diabetes. The patient should be completely clad in flannel, and should have two or three warm baths every week, or an occasional Turkish bath. Change of air, especially to the seaside, with sea-bathing, is useful in some cases. Regular and sustained active exercise in moderation is often of great service.

3. *Therapeutic Treatment.* Numerous medicines have been brought forward, which are supposed to have a direct curative influence upon diabetes, especially in limiting the amount of urine and sugar discharged. The principal of these include opium, given in gradually increasing doses up to gr. vj-xx daily, which certainly seems to be useful in some cases, codeia in doses of from gr. ½ to gr. iij, morphia, alkaline bicarbonates, pepsin, rennet, arsenic in the form af Fowler's solution, iodine or iodide of potassium, bromide of potassium, conia, cannabis indica, lactic acid or lactate of soda, glycerin, quinine, ergot, ether, valerian, permanganate of potash, and peroxide of hydrogen. These are supposed to act either through their influence upon the nervous system, or by promoting the decomposition and combustion of sugar, or by supplying a readily combustible substance in its place. The evidence in favor of the efficacy of these drugs, however, is by no means sntisfactory.

4. *Symptomatic Treatment* often calls for attention in diabetes, this being especially directed to the digestive organs, to the general condition and state of the blood, to nervous disturbance, in the way of sleeplessness and restlessness, and to the various complications. These must be managed on ordinary principles. Iron, especially in the form of tincture, as well as other tonics, are often of much service. Cod-liver oil is also valuable in many cases. It must be borne in mind that complications may considerably modify the treatment of cases of diabetes. For diabetic coma the chief measures which have been tried are transfusion, inhalation of oxygen, and the administration of medicines to check the fermentative process which develops the poison, such as carbolic acid, salicylic acid or its salts, and thymol.—FREDERICK T. ROBERTS.

DIARRHŒA.—*Etiology.*—Diarrhœa results either from increased peristaltic action of the intestines; an unusually liquid state of their contents, especially when this depends on excessive secretion; or, most commonly, from a combination of these conditions. The exciting causes of these morbid phenomena may be thus arranged: 1. Irritation of the intestines by food, either taken in excess, of improper quality, undigested, or having undergone decomposition; impure water or other liquids; purgative medicines and irritant poisons generally; excessive or unhealthy secretions, especially bile; worms, trichinæ and other parasites, possibly vegetable as well as animal; or retained fæces. 2. Mechanical congestion of the intestinal vessels, owing to some obstruction in the portal circulation. 3. Organic affections of the intestines, viz., enteritis, either chronic or acute, albuminoid disease and ulceration. 4. Occasionally mere nervous disturbance, such as strong mental emotion, or reflex irritation in connection with dentition. 5. Certain diseases in which diarrhœa is a prominent symptom, especially cholera, typhoid fever and dysentery. By many it is then regarded as eliminatory in its character, serving to carry off some poisonous material; and the same thing is applied to its occurrence in renal disease, gout, pyæmia; and various fevers; or when it takes place as a critical discharge at the close of pyrexial affections. Colliquative diarrhœa not unfrequently sets in during the course of certain wasting chronic affections, especially towards their termination, aiding in bringing about a fatal result, especially in phthisis, cancer, splenic or suprarenal disease, and Hodgkin's disease. 6. The rapid suppression of discharges, or the absorption of dropsical fluid, when the diarrhœa is termed vicarious. 7. Causes of a more general character, viz. exposure to changes of temperature, or to excessive cold or heat; foul air, overcrowding, and other anti-hygienic conditions; excessive fatigue, emanations from decomposing animal matter, and malarial influence. The combined action of some of these causes, along with improper diet, give rise to the summer and autumn diarrhœa, or so-called English cholera, so prevalent at some seasons. 8. Very rarely the escape of some fluid accumulation into the intestines, such as the contents of an abscess; peritoneal effusion, or the fluid portion of a hydatid tumor.

Characters.—In all cases of diarrhœa it is requisite to ascertain its duration, the number of stools passed in the twenty-four hours, and their relation to the introduction of food, if any; and also to inspect specimens of the excreta, if practicable, as frequently as may be desired. The principal varieties of loose stools are feculent; lienteric when they contain cognizable fragments of food, in some cases scarcely at all changed; bilious; serous or watery, also called a flux; mucous or gelatinous; bloody; fatty; purulent; chronic or white flux. As a rule the materials are more or less mixed, and by an examination of the characters of the stools the cause of the diarrhœa may often be determined. Various other digestive disturbances are usually associated with this symptom, indicated by griping or other pains in the abdomen, sickness, borborygmi, straining at stool, or an abnormal state of the tongue. The stools may irritate the anus considerably, especially when the diarrhœa is long-continued and of a watery kind. It must be remarked that patients sometimes state that they are suffering from looseness of the bowels, when on investigation it will be found that there is only some local discharge, especially in connection with fistula in ano. The association of mucous discharge with retained fæces has already been alluded to.

If diarrhœa is considerable or of long duration, it necessarily causes more or less debility or wasting, in some instances very rapidly and markedly reducing the patient.

Treatment.—The first matter as regards the treatment of diarrhæa is to determine whether it should be checked or not. In some instances this is not desirable, provided it is not excessive, the discharge by the bowels being preservative and beneficial, as, for instance, in connection with Bright's disease or portal congestion. Some even go so far as to promote diarrhœa in certain diseases, such as cholera and typhoid. As a rule it is necessary to check this symptom either entirely or partially. For this end the diet must be strictly regulated, and this may be the only thing needed, especially in the case of children. Milk with farinaceous articles, especially arrowroot and corn flour; weak beef tea thickened with these materials, and milk puddings, constitute the best articles of diet. Milk with lime-water, if administered in small quantities and at proper intervals, will often speedily put a stop to the diarrhœa of children. In some cases a little brandy and water, or a mixture of brandy with port wine, is beneficial. Not uncommonly an aperient is indicated at the outset, with the view of getting rid of irritant materials from the alimentary canal. Castor oil, calomel, a saline draught or Seidlitz powder, or a full dose of tincture of rhubarb act best in these cases, and they are often advantageously combined with a little opium. Antacids, such as carbonate of soda or magnesia, are beneficial when irritating secretions are present in the bowels.

Among the direct remedies for combatting diarrhœa opium holds the first place, given either alone or with other medicines, in the form of pill, tincture, confection, various powders, enema, or as syrup of poppies. An injection of m xv–xx of laudanum with ℥ iss.—ij of decoction of starch, often acts most beneficially. The other principal medicines administered in acute cases are prepared chalk, aromatic confection, catechu, kino, logwood, krameria, alum, dilute mineral acids, especially sulphuric, tannic, and gallic acids, carbonate or nitrate of bismuth, chloral, and chlorodyne; in chronic cases tincture of sesquichloride or solution of pernitrate of iron, acetate of lead, sulphate of copper, or nitrate of silver. Ipecacuanha is invaluable in certain forms of diarrhœa. Among the most efficient combinations will be found chalk mixture with tincture of catechu and opium;

compound chalk powder, with or without opium ; compound kino powder; decoction of logwood with lime-water, particularly valuable for children ; dilute or aromatic sulphuric acid with laudanum ; Dover's powder, alone or with carbonate of bismuth ; and, in chronic cases, pills containing acetate of lead or sulphate of copper, combined with opium.

Creasote, carbolic acid, and other antiseptics have been employed in certain forms of diarrhœa, with the view of destroying vegetable parasites, upon which this symptom is supposed to depend.

Local applications to the abdomen are frequently very beneficial in the form of poultices, fomentations, or dry heat. A flannel bandage worn round the abdomen is useful in some chronic cases. Occasionally a patient may by voluntary effort to some extent suppress diarrhœa, especially when this is due to emotional disturbance.—FREDERICK T. ROBERTS.

DIARRHŒA AND DYSENTERY, Infant.—Of all the deaths in the first year of life about forty per cent. are due to diseases of the digestive organs, and half as many to such of the respiratory organs. In the second year, the main cause of death changes completely, for of all the deaths taking place in that year, but nine are due to digestive, and thirty-six per cent to respiratory disorders. Thus in the first year, stomach and intestines, in the second, bronchi and lungs, are the sources of high death-rates. The respiratory organs are better protected, usually, in the first year, and the digestive organs treated more improperly. Such infants as survive the first are exposed to the same parental ignorance and carelessness concerning the requirements of the respiratory organs during the second.

Mortality diminishes with every day of advancing life. Every additional hour improves the baby's chances for preservation. Almost one-half of the infants dead before the end of the first year, die before they are one month old. Thus the causes of disease are the more active the earlier they are brought to bear upon the young with their defective vitality.

Two grave conclusions are to be drawn from this fact. The first is, that the diminution of early mortality depends on avoiding diseases of the digestive organs by insisting upon normal alimentation. This is principally important in the first few months. While breast-milk has been shown to lower infant mortality through the whole first year, it does so more in the first few months. Thus, though an infant may not be fed on breast-milk through the whole normal period of nursing, a great gain, indeed, is accomplished by insisting on nursing, though for a limited time, perhaps two months only. There are but few mothers but will not be capable of nursing during that brief time, and none who ought to be spared the accusation of causing ill-health or death to her baby if she refuse to nurse it at least through the first dangerous months. The second conclusion, resulting from many figures, is this, that the dietetic problems and rules for the infant concern the digestive organs mainly, so much so, indeed, that infant dietetics and the dietetics of the infant digestive organs appear nearly identical.

It is true that in this city we meet with a high mortality, even in children of more than a year. The second summer is regarded with awe and fear amounting to superstition. In fact, public opinion looks for a higher mortality in the second than in the first summer. The fallacy of this assumption can be easily corrected by the statistical reports; and the high mortality rate itself could be easily reduced by such parents as would feel convinced that it is external causes which kill their children, and not the natural course of development. The second summer is the period of danger in part only because of the heat of the season, but mainly of the errors in feeding. Conscientious and intelligent families in good circumstances are not apt to lose their infants in their second summer.

Nor is it necessary that here, and on this occasion, I should insist upon the danger incurred by the belief that diarrhœa—a pathological condition—is a normal attendant on and a relief of a physiological process such as dentition. This much is certain, that very few, if any popular beliefs have been more destructive than this, that an intestinal catarrh must be left alone, no matter from what source it originated.

Healthy infants have a normal tendency to loose, liquid, or semifluid evacuations from the bowels. The causes lie partly in the condition of the intestinal tract, and partly in the nature of the normal food, viz., breast-milk. The peristaltic movements are very active; the young blood-vessels are very permeable; the transformations of surface cells very rapid; the peripheric nerves very superficial, more so than in the adult, whose mucous membrane and submucous tissue have undergone thickening by both normal development and morbid processes. In the young infant, the peripheric ends of the nerves are larger in proportion than in the adult, the anterior horns of the nerve-centres are more developed than the posterior ones. Thus the greater reflex irritability of the young, particularly in regard to intestinal influences, is easily explained. Besides, the action of the sphincter ani is not quite powerful, the feces are not retained in the colon and rectum, and no time is afforded for the reabsorption of the liquid or dissolved constituents of the feces. Moreover, the frequency of acids, sometimes normal, in the small intestines gives rise to the formation of alkaline salts with purgative properties. Hoppe-Seyler found free acids in the feces of dogs and adults. Wegscheider met them in nurslings who received nothing but mother's milk. An explanation of this occurrence may be this, that the quantity of food is often too large, but it is just as probable that the amount of digestive fluid is too small. For the diastatic effect of the pancreas is limited at that as at any other age.

The nature of breast-milk, even when absolutely normal, is such as to facilitate frequent, large, and fluid evacuations.

Careful investigations led Wegscheider to the following important results: fats are not completely absorbed; one part leaves the intestine in a saponified condition; a second part, as free, fatty acid; a third, as fat in an unchanged condition.

Where no food is given but mother's milk, which contains fat in proportionately smaller quantities than cow's milk, and finely suspended and easily absorbed, a good deal of fat is eliminated without any change.

What has been called detritus in the feces is not all undigested casein, but, on the contrary, it is mostly fat, and very probably remnants of intestinal epithelium. This milk detritus, so-called casein, and mainly consisting of olein, margarin, and stearin, is not soluble in water, acids, or alkalies, but very soluble in alcohol and ether.

Practically this fact is of the very greatest importance. Fat is not completely absorbed under the most normal circumstances. Fat-acids are easily formed, and accumulate to such an extent that they are found in moderate quantities in even the healthiest nurslings. Superabundance of fat-acid is common derangement of digestion and assimilation, and it impedes the previously normal secretion of other digestive fluids. Thus there is a plus of fat, even in the normal food of the nursling, the breast-milk

The conclusion, then, which I will record here at once, is that we have to be very careful in the preparation of artificial food. It is almost certain that we give too much fat; it is scarcely ever probable that there is too little. Therefore the addition of cream is reprehensible, no matter in what shape. Whenever cream and cream mixtures have been recommended, inventors and backers have always made the statement that such mixtures are, "as a rule," well tolerated. It is a doubtful praise, however, that food should be simply well tolerated, "as a rule." The fact alluded to has probably been the cause why Liebig has, in his artificial food, only forty per cent. of the fat contained in mother's milk.

Thus in the most normal milk there is more fat than required. Whenever changes set in, the disproportion can be greater yet. For milk is no stable article, its chemical composition permits of a great latitude indeed. Normally it is the result of transformed glandular substance.*

The mammary gland is no filter, through which the serum of the blood, or the solutions of salts, or the transformed foods are rendered accessible to the hungry young. The quality and quantity of milk depend upon the development of the gland. Milk is not the product of the action of the cells; it is the transformed cells, the very organ. Thus the nursling is the veriest carnivorous animal. As long as the epithelium has not undergone a total change, the secretion is not milk, but colostrum, with its large globules. The character of the gland influences the milk much more than food. The latter influences milk only by building up the gland, the cells of which receive materials of different kinds, the principal of which is albumen.

In accordance with this, the nature of milk is beautifully illustrated by its chemical composition. Its ashes are tissue ashes, not those of plasma, for they contain much potassa and phosphate of lime, but little chloride of sodium.

In the first period of lactation the glandular transformation is not yet accomplished. The secretion is of a different nature. It requires days to exhibit casein. Until then the protein shows the nature of albumen. At the same time the percentage of butter and salts is very high indeed, both of which explain the laxative character of colostrum. No less do macroscopic and microscopic observation convey the impression of its being incomplete. It is yellowish, thickish, the fat globules are large, unequal, sticky, and mixed with epithelium almost unchanged. There is less potassa and more soda than in normal milk, approximating it to the chemical character of plasma. Besides, colostrum of the cow has not unfrequently been found to contain blood and to coagulate when being boiled. Thus colostrum is more like a transudation than a glandular secretion. Such colostrum is not only met with in the first week after confinement, but in disturbances of the general health, in anæmia, fevers, pregnancy, or advanced age of mother or nurse. Also when the gland itself is insufficient, or the woman too young, or slowly convalescent, or neurotic and liable to vaso-motor disturbances. The administration of such milk disturbs the health of the infant through the bringing on of gastric or intestinal catarrh.

Thus there is no stability in the nature of breast-milk, and very much less in the human than in the animal female, for obvious reasons. Its constituents and effects may even change from hour to hour, from day to day, sometimes it will be milk, sometimes milk with transuded serum.

That a mere transudation should contain all sorts of material circulating in the blood-plasma is evident. Therefore colostrum is apt to transfer to the nursling the liquid constituents of the mother's blood, no matter whether normal or abnormal, beneficial or injurious, organic or inorganic. The reports of infants harmed by the mother's opiate, influenced by her taking mercury, belong, therefore, mostly to the earliest period of lactation, or to a period of sickness or debility on the part of the woman. The more normal the mammary secretion the less the danger in this respect. Very few persons, however, are always in undisturbed health.

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* Compare "The *Influence of* Menstruation, Pregnancy, and Medicines on Lactation," *by A. Jacobi, M. D., in Amer. Jour. Obstet.*, July, 1877.

Thirdly as to sugar. It is abnormally plentiful in colostrum, and in some milks, at times, its percentage is lower than normal. In the former it is purgative, in the latter its absence is one of the causes of constipation. Thus the addition of a piece of sugar—which need not be milk-sugar—to breast-milk is apt to heal constipation in the infant. I dissolve it in the smallest possible quantity of water, say a teaspoonful, and let the baby take it before each nursing.

Fourthly as to casein. When present in an abnormally high percentage, it may act in two ways. It will either constipate, particularly as the high percentage of casein and a low one of sugar go hand in hand, mostly—or by remaining undigested, and acting as a local irritant, thereby producing diarrhœa. In these cases of diarrhœa the stools are mixed with white flocculi, small or large, sometimes in astonishing quantities, and for a long period. The treatment of such diarrhœa is by no means very simple, unless the breast-milk is changed. When such a change cannot take place, I add oat-meal gruel or barley-water in such a manner, that a few teaspoonfuls of it are administered to the baby before each nursing. I shall return to the consideration of this proceeding.

The natural food of the infant being sometimes a cause of tendency to diarrhœa, and of actual diarrhœa, the administration of artificial foods must necessarily be inferred to threaten a real danger. Let us examine some of the articles of food mostly used for the young.

Goat's milk ought to be rejected because of its large percentage of fat, not to speak of its odor, which at times is very disagreeable.

Cow's milk contains more butter than human milk. If the latter, as stated above, is not entirely digested, cow's milk butter will certainly leave even more remnants to encumber the intestinal canal.

The reaction of human milk is alkaline, that of cow's milk rarely to the same degree. It is apt to become acid soon after milking, and has been found to exhibit acid reaction while still in the udder.

But the main difficulty lies in the large percentage and in the nature of the casein of cow's milk.*

The casein of cows's milk and the casein of woman's milk are two different substances. When isolated by alcohol, by which both are thrown out of their combinations to a certain extent, the chemical properties are found to differ widely. Thus obtained, cow's casein, when moist, is white; when dry, yellowish. It reddens litmus-paper, and acidulates water, in which it is soluble in the proportion of 1–20. Woman's casein, however, in its moist condition, is yellowish, alkaline, or neutral, and dissolves almost entirely in water, the solution being of neutral reaction. Vierordt and Biedert found the quantity contained in the two milks to differ, there being less in woman's milk than in cow's milk.

When exposed to artificial gastric juice they also act differently. In a surplus of it woman's casein is dissolved in a short time; cow's casein in twenty-four hours. Mineral acids, lactic acid, acetic acid, tartaric acid, Epsom salts, phosphate of lime in solution, coagulate cow's milk in hard and dense masses; not so human milk. Solutions of both kinds of casein in alkalies show many similar properties; but the sediment produced by the addition of lactic acid can yield essential differences. Thus there is a chemical as well as a physical difference between the two species of casein. Although their relation to artificial gastric juice has not been found to differ to that extent by Dr. C. P. Putnam, of Boston, it is upheld by a number of other observers, and the fact is beyond doubt that pure cow's casein is very much less digestible than human casein. At all events, it should be so considered, and infants should have only as much casein as proves digestible. One of the alleged means of combating the improper effect of casein is to increase the relative amount of fat by adding it to the food. It is true that in this way a more proper relation of the two can be obtained, but certainly no more proper relation of the two to the insufficient condition of the infant digestive organs.

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* Vide A. Jacobi's Infant Diet, in Dr. A. H. Buck's Hygiene.

Besides, the addition of cream to either casein or fresh milk has something very doubtful about it, as at the time when cream has formed upon milk, by simply allowing it to stand, the formation of lactic acid is going on all the time. At all events, no addition we know of can render cow's casein more digestible than Nature made it, and the only thing which can be obtained by any sort of manipulation of the milk is to make it less injurious. Perhaps, however, the plan upon which Dr. J. Rudisch has acted may recommend itself to the attention of the practitioner. In order to make cow's milk more digestible, he has introduced into my practice a mixture which promises to be of great value in all those cases in which coagulability of the milk is the prominent obstacle to its usefulness. The mixture suggested by him, and used by us up to this time mainly in diseases of adults, such as anæmia, gastric catarrh, ulcer of the stomach, slow convalescence, etc., is the following: to one pint of water one-half teaspoonful of officinal dilute muriatic acid is to be added. To this mixture add one quart of raw cold milk; mix the two liquids thoroughly and then boil for ten or fifteen minutes. I have found this preparation to be very digestible, and well tolerated by very feeble digestive organs. Not only clinical experience favors this preparation, but direct experiments also. When "liquid pepsine" is added to common milk, coagulation takes place very rapidly, and in thick coherent masses. The same liquid pepsine, when added to the above mixture, produces so slight a coagulation that it can scarcely be observed. The coagula also are small, and do not adhere firmly to each other. Essence of rennet coagulates common milk speedily and completely; the above mixture more slowly and not so completely. The coagulation of common milk exhibits, after a certain time, thick, dense, and firmly coherent masses. The coagula produced by the above mixture are fine, loose, and are easily separated when the liquid is shaken.

Valuable as this preparation of cow's milk may prove in future, there is one method for making cow's milk more available, which is at once simple and effective. No cow's milk ought to be administered without the addition of chloride of sodium. Not only cow's milk, but also—and even much more so—farinaceous admixtures to cow's milk require its presence in the food.

The method of preparing condensed milk with the admixture of such great quantities of sugar as to yield from thirty-nine to forty-eight per cent. of sugar in its solid ingredients is a well-known process. With regard to this preparation, Kehrer says that when sufficiently diluted it readily induces the formation of lactic acid, and that delicate children will not thrive on it. In such cases he deems it necessary to add barley-water or oatmeal gruel as well as antacids. Fleischmann also accuses it of causing a predisposition to thrush and diarrhœa. He lays stress upon the fact that, even when it has been properly diluted, the proportion of the protein compounds to the carbohydrates is diminished, and thereby its nutritive value impaired. My own experience with condensed milk, which has been rather extensive, has led me to learn that, when diluted simply with water, even though to the proper degree, it is apt to be followed by disagreeable results; although the influence of the large amount of sugar does not operate in the manner as above alleged. For the sugar which is added to condensed milk is not the easily decomposed milk-sugar. Yet catarrh of the stomach and bowels is a frequent result of its use. I have seen few children enjoy undisturbed health who were fed exclusively upon condensed milk. Those, however, who take it mixed with a certain proportion of barley-water, either regularly, as I recommend, or in cases of temporary necessity, as advised by Kehrer, thrive quite well. I cannot say that I have been able to discover any material difference, whether condensed milk, or good ordinary city milk, was given in this way. But it should not be forgotten that barley-water is a more desirable addition to the mixture than oatmeal gruel, because of the laxative effect which the latter may have. If the condensed milk be given in this way, we need not fear a repetition of Daly's experiences. He found that children took the condensed milk readily, and grew fat; but in case they fell sick, they showed but slight endurance; they began to walk late; their fontanelles were slow in closing, and other signs of rachitis showed themselves.

The preventative treatment of diarrhœa, depending on defective alimentation, consists in so changing and arranging the milk used for babies that the casein will not coagulate in large lumps, and thus become more digestible. That object can be obtained by adding such farinaceous food as does not contain much starch. Some little starch is digested from the first days of life, the parotid having diastatic effect; in a few months after birth such vegetables as contain starch in moderate, but not overwhelming percentage may be used as additional infant food. Still it is not absolutely necessary that every particle of ingesta should, in all instances, be digested and assimilated. That is impossible; the very breast-milk contains such amounts of fat that it cannot all be digested and absorbed. The requirement is only that not enough should remain undigested to encumber and irritate the intestinal tract.

The principle on which I base the theory of this treatment is simple enough. It has been published in my Infant Diet, and again in the volume on Hygiene alluded to above. Some of it has also been published by a former clinical assistant of mine, in a number of the *Jour. of Obst.* years ago. It consists in diluting the boiled and skimmed milk with barley-water or oatmeal gruel. It must be boiled to check its tendency to become sour, to remove a portion, though small, of its casein and fat, and to expel the gas contained in the raw milk to the amount of three per cent.

Of the two, as may be known, I prefer barley for general use.

The prepared commercial barley is characterized by its fineness and whiteness. But these qualities are suspicious characteristics; the less the quantity of the yellowish outer layers of the barley, the less is it to be recommended. The prices of the grain, though low, vary in such a manner that adulteration by refining pays very well. I would, therefore, recommend that the barleycorn which is employed for infant diet should be ground as thoroughly as possible in a coffee-mill, both in order to diminish the period necessary for cooking it, and also in order to retain the gluten. *It is even preferable, for very young infants, to cook the barley whole for hours*, thereby to burst the outer layers of cells, empty their contents, and then, by straining, to get rid of the larger part of the starch which is found toward the centre. The next best method consists in crushing the whole grains of barley, and not to employ the so-called pearl barley, which is barley minus husk. At a more advanced period of life the latter preparation, with its greater amount of starch, will suffice, however, because oatmeal, on account of its larger percentage of fat and mucin, is more liable to relax the bowels. In other respects the chemical composition of the two is so nearly alike that it would be immaterial whether we choose one or the other. But there is no danger to which little children are so liable as that which arises from their tendency to diarrhœa. My advice, therefore, is to administer barley to children who manifest a tendency to diarrhœa, and oat-meal to those having a tendency to constipation, and, whenever a change occurs in the intestinal functions, to give one or the other, according as consitpation or diarrhœa predominates.

I hold this mixture to be the *conditio sine qua non* of the thorough digestion of the milk. It, only, will insure the proper nourishment of the infant. With this food alone I have seen children endure the heat of summer without any attack of illness whatever. It is because I am so deeply convinced of its importance, that I return to the subject here. In this climate, so perilous to infant health, where severe derangements of the digestion belong to the most common of the daily experiences of the practitioner, I have had occasion again and again to be convinced of the reliability of my mixture. It has this advantage too, that it necessitates no dependence upon the honesty or competence of the apothecary or manufacturer, but this mixture can be prepared by any one, however poorly situated. I conceived it to be necessary to discover a kind of food, suitable to the infantile age, which could not be spoiled through ignorance and fraud, nor be liable to have its price enhanced by trade dealers. All of these indications have been fully met in the preparation which I have described.

The object I desire to attain is to insure a slow action of the gastric juice, or of the excess of acid in the stomach upon the casein of the milk, and this object I attain under all circumstances. Should a slight diarrhœa occur, or a little casein be vomited (a rare accident, to be sure), or casein occur in the stools, then all that is necessary is to diminish the proportion of milk. It may sometimes be necessary, though very seldom, to withdraw the milk entirely for a time, but only in cases of real illness. If the physician or attendants have properly apportioned the ingredients of the mixture, we may be rather sure that the child's digestion and assimilation will be regular and normal. Infants that are partly nourished at the breast almost invariably thrive well with the addition of my mixture. Children, from their fourth or fifth month and upward, may often be fed with it exclusively, and not unfrequently nothing else is given from the day of the birth. I can positively affirm that in all these cases assimilation and increase in weight have proceeded quite normally. Altogether, the brief form in which I laid down the above principles, years ago, and in which they have been published several summers by the New York Health Board (See Infant Diet, 2d Ed., 1876, p. 118) for the benefit of the general public, rich and poor, has always been found satisfactory.

The addition of barley or oat-meal for the purpose of rendering milk digestible is not, however, absolutely indispensable, though I have learned to prefer them. For gum-arabic and gelatine are also very valuable ingredients, indeed, of infant foods.

As far as the former is concerned, Frerichs, Lehman, and Husemann did not admit its undergoing any change in the human body. Gorup-Besanez believes in its solubility, but not in its digestibility; hence if, in his opinion, gum-arabic is an important aid in digestion, it is so for one reason only, namely, that it acts mechanically, and renders the coagulation of milk less dense. Of late, however, Uffelmann has made some experiments with a solution of gum-arabic of the strength of eighteen parts of the gum to two hundred of water. His experiments were made upon a boy upon whom gastrotomy had been performed, thus affording opportunity for making direct observations. When he introduced this solution into the boy's stomach, he found grape-sugar after some time, no saliva being present. The same transformation has been observed in the Munich laboratory.

Fifteen grammes of the above solution yielded five centigrammes of grape-sugar after forty-five minutes; thirty grammes gave twenty-eight centigrammes after sixty minutes. The liquid taken from the stomach in the latter case was very acid indeed. It matters not whether this acid was inside the stomach previously, or was developed during the presence of the gum-arabic solution; in both instances it appears that the development of muriatic acid and the transformation into grape-sugar go hand in hand. It is possible, then, that it will be found practical, in those cases in which the object is not simply to mix milk with gum-arabic, but also to derive benefit from the digestion of the gum, to add a small quantity of muriatic acid.

Gelatine, in the opinion of many, when combined with milk, fulfils two indications. The one is the same as that obtained by the mechanical effect of gum-arabic and farinaceous articles; the other is found in its usefulness as a tissue-building material. Guérard quotes Jean de Lery, who speaks as follows: "Ayant expérimenté que cela (skins, parchemin) vaut au besoin, tant que j'aurais des collets de buffles, habits de chamois, et telles choses ou il y a suc et humidité, si j'estois enfermé dans une place pour une bonne cause, je ne me voudrois pas rendre pour crainte de la famine." Papin is reported to have made the offer to Charles II. of England to furnish for the use of poor-houses and hospitals "un quintal et demi de gelée" with "onze livres de charbon." This offer was refused because a dog was paraded before Charles wearing a sign-board containing said dog's request not to be deprived of his mess of bones.

The French Academy of Medicine has taken great pains to discover the properties of gelatine. After Magendie in 1848, Vrolik in 1844, Bérard in 1850, and Edwards and Balzac, had published their reports upon the subject, Guérard comes to the following conclusions: 1. That gelatine is very nutritious; 2. That very probably it is of great importance in the process of building up cellular tissue, therefore absolutely necessary for the preservation of life. Frerichs, Metzger and De Bary, Schroeder, Kuehne and Etzinger, found that gastric juice changes gelatine in such a manner that it loses the property of gelatinizing. This effect was not produced when it was treated with muriatic acid only. On the other hand, Imthurn also attributes the effect to the influence of muriatic acid. It is true that Meissner and Kirchner have entirely denied the changeability of gelatine by means of gastric juice. But Gorup-Besanez is of the opinion that gelatine is peptonized in a manner similar to the albuminates. It seems that Uffelmann has also settled this question. He found, in the gastrotomized boy, first, that while he was feverish, and again without fever, the gelatine was speedily dissolved in the gastric juice. It was so modified at the end of one hour that it would no longer coagulate, and was easily diffused. To produce this change by means of artificial gastric juice, he found, however, that from eighteen to twenty-four hours were necessary, and in both instances there was no offensive odor. When the experiment was performed within the stomach, he occasionally observed the presence of grape-sugar. When that occurred, the temperature of the body was elevated. No grape-sugar was ever found when the gelatine was exposed to the action of artificial gastric juice. Gelatine digested in gastric juice retains its essential chemical properties. It resembles peptone, inasmuch as it is not precipitated by acids. It differs from peptone, inasmuch as its diffusibility is less, and, when dissolved in acetic acid, it can be precipitated by ferrocyanide of potassium. It is so much like peptone that its digestibility can hardly be doubted, not to speak of the direct observations made by Uffelmann. There is one point, however, not to be lost sight of, viz., that it is apt to putrefy, and therefore requires the addition of a small quantity of muriatic acid. The latter point is of great practical importance; for, in acute cases, in slow convalescence, in anæmia, the secretion of pepsine and muriatic acid is very much limited. For that reason muriatic acid should be added whenever gelatine is administered.

When it is to be mixed with milk, in such cases, the plan as recommended by Dr. Rudisch, and specified above, will perhaps be found most useful.

Curative Treatment.—So far as nutriment is concerned, the amount of food should not be larger than we have reason to expect can be easily digested. At all events, either lengthen the intervals between the meals or reduce the quantity of food given at one time, or both. When diarrhœa makes its appearance in infants who have been weaned, it is desirable to return them to the breast. Those who never had breast-milk may be given the breast if they can be induced to take it, but only rarely will this be found possible. Whenever a child at the breast is taken with diarrhœa, the passages from the bowels should be studied as to their contents. If a certain amount of curd is found in them, the least that is to be done is to mix the breast-milk with barley-water. This may be done in such a manner that, each time before nursing, one or two teaspoonfuls of barley-water is given the child, so that the farinaceous food and the breast-milk will mix in the stomach. Or, it may be found advisable to alternate breast-milk and barley-water. In bad cases, particularly when the milk is found to be white and heavy and contains a great deal of casein, it will be found necessary to deprive the child altogether of its usual food. In such cases, the child will do better on barley water alone (this to be continued for one or two days), than to expose it to the injury which will certainly follow the continuation of the casein food.

When diarrhœa occurs in children who have been fed alone upon cow's milk, unmixed or mixed, it is necessary to reduce the quantity of cow's milk in the mixture. As a rule, we have to remember that cow's milk alone is apt to produce diarrhœa, and it should be considered as a maxim that, whenever diarrhœa makes its appearance, the amount of cow's milk given to the child should be reduced. When a mere reduction of the quantity does not suffice, it is very much better to deprive the child of milk food altogether. Not infrequently the removal of milk from the bill of fare is the only thing which will restore the child to health. It is possible that a mixture, such as recommended by Dr. Rudisch, of which I have spoken before, will be found digestible, even in such cases. My experience, however, is not sufficient to decide that point. In many cases, as a dietetic measure, it will be found advisable to add one or two tablespoonfuls of lime-water to each bottle of food with which the child is supplied.

In those cases in which barley-water does not seem to suffice as a nutriment, or where it would be dangerous to allow children to lose strength, a mixture which I have used to great advantage is the following: Mix the white of one egg with four or six ounces of barley-water, and add a small quantity of table salt and sugar, just sufficient to make the mixture palatable. The child can take this either in large or small quantities, according to the case.

In such cases in which the stomach is irritable and vomiting has occurred, it is now and then better to give a small quantity, even one or two teaspoonfuls, and repeat the dose every ten, fifteen, or twenty minutes, than to give larger quantities at longer intervals.

In those in which the strength of the child has suffered greatly, it is necessary to add brandy to the mixture in such quantity that the child will take from one drachm to one ounce (grammes 4.0 to 30.0), more or less, in the course of twenty-four hours.

In those extreme cases in which the intestinal catarrh is complicated with gastric catarrh, where the passages are numerous and copious, and vomiting constant, where both medicines and food are rejected, there is frequently but one way to save the patients, and that is to deprive them *absolutely of everything in the form of* either drink or food or medicine *It is true that such babies will suffer* greatly from thirst for an hour or tw but it is a fact that, after two or three hours, these children will look better than before the abstemious treatment was commenced. Not infrequently four or five hours of total abstinence will suffice to quiet the stomach and diminish both the secretion and the peristaltic movement of the intestinal tract. In some cases six or eight hours of complete abstinence will be required; or such children may be starved for even twelve or sixteen hours, with final good results. The first meals afterwards must be quite small, and they will be retained, and, as a rule, such children will subsequently do well.

I need not say here that, in addition to the dietetics for the digestive organs, it is necessary to supply the patient with as much cool fresh air as possible. The worst out-door air, when cooler, is better than close in-door air. The undeveloped condition of the nerve-centre in the normal infant, the relaxation of the inhibitory nerves by heat, the absence of radiation from the surface, the lacking stimulus—during hot weather—of the cutaneous sensitive nerves, the diminished metamorphosis of tissue, the diminution of the powers of digestion, not only by shortening nutrition, but by directly lowering the secreting powers of digestive glands in the stomach and intestines, are just as many factors in the production of the very worst forms of infant diarrhœa.* I have kept very bad, desperate cases out all night upon the bluffs of the East river. The windows must not be closed. If possible, the children should be sent immediately to the country and into the mountain air.

The second indication consists in the removal of undigested masses retained in the intestinal tract. Not only in cases in which the diarrhœa has resulted from previous errors in diet of the child, but also in those cases dependent upon sudden changes of temperature and exposure, it is desirable to empty the intestinal tract of its ballast. For that purpose castor oil, calcined magnesia, or calomel may be used. So far as the latter is concerned, the discrepancy of opinion with regard to its efficiency will probably be found to depend upon the variation in the size of the doses recommended by different authors. When a purgative effect is desired it should not be given in small doses, and, according to age, from two to six (0.1–0.4) grains should be administered.

Third.—Nothing should be given that contains salts in any sort of concentration. Thus, beef-tea should be avoided. It has come very largely into use in practice among children both in this country and in Great Britain. In Germany, too, it has found very many advocates, and among some who have abandoned the obsolete notion that when prepared in the customary way it contains a large proportion of protein in its composition. It must be remembered that this form of meat extract contains a very large amount of salts, and that the direct effect of these upon the intestinal canal may be productive of very unpleasant consequences. It is a mistake to give it when the intestines are irritated or very susceptible of irritation, for the reason that diarrhœa is apt to directly follow its use. Nevertheless, I have often seen beef-tea given under these very circumstances for no other object than the vain one of furnishing the child with a great amount of nourishing food. This is very commonly done during the obstinate and exhausting diarrhœa of summer. If the people insist upon giving it, and there is no special contraindication to its use, in a given case, it should be administered only in connection with some well-cooked farinaceous vehicle, and the best of all for this purpose is barley-water ; or it may be mixed with beaten white of egg, but no more chloride sodium should be added. For the main danger in beef-tea is the concentrated form in which its salts are given.

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* Compare: "Infant Diet," second ed., 1876, pp. 101–116.

Fourth.—Everything should be avoided that increases peristaltic motion. Thus, carbonic acid and ice internally.

Fifth.—Avoid whatever threatens to increase the amount of acid in the stomach and intestinal tract. There is so much acid in the normal, and still more in the abnormal stomach and intestinal tract, that it is absolutely necessary to neutralize it. For that purpose any alkali, perhaps, will suffice, but it is safer tc resort to preparations of calcium than of sodium or magnesium. Soda and magnesia, when introduced into the stomach and duodenum, will find a number of acids and form laxative salts. Frequently I use carbonate of lime; not infrequently phosphate of lime. Both of these will act as antacids, but the latter preparation is to be preferred in those cases in which free phosphoric acid is deemed of importance for the purpose of facilitating pancreatic digestion.

So far as lime-water is concerned, its administration, certainly, is correct chemically. But we should not place too much reliance upon this popular remedy. We should not forget that it contains about one part of lime to eight hundred of water, and that it is necessary to swallow at least two ounces of the fluid in order to obtain a single grain of lime.

A further indication is, the necessity of destroying ferments. For that purpose most metallic preparations will do fair service. One of these, that has been extensively used, is calomel, and now in small doses frequently repeated—$\frac{1}{16}$, $\frac{1}{4}$, or $\frac{1}{2}$ a grain (0.1–0.15–0.03), every two or three hours. As to its effect as an anti-fermentative, there can be no doubt. It is very uncertain, however, as to how it produces this effect. It is possible that it acts by a portion of the drug being changed very slowly to the bichloride of mercury, which is known to be a very powerful agent in the prevention of fermentation. It is certain that one portion, at least, of the mercury is used to bind sulphide of hydrogen, which often acts in a poisonous manner. Infants will bear calomel very well, perhaps for the reason that elimination is so much more rapid in them than in adults.

Nitrate of silver, when given for the same purpose, should be largely diluted. From $\frac{1}{40}$ to $\frac{1}{16}$ of a grain (0.0015–0.004), dissolved in a teaspoonful or tablespoonful of water, may be given every two or three hours, and not infrequently with fair result. At all events, it does not answer to use a concentrated solution. Whenever it is concentrated, it acts more as a caustic than as an astringent. This remark is especially important with regard to injections of nitrate of silver into the rectum, where it is apt to do as much harm as good. Even a mild solution—one or two grains to the ounce of water (1 : 500 or 250)—when injected into the rectum is apt to give rise to tenesmus and soreness about the anus; whenever it is to be given in that way, the solution should be mild and largely diluted, or the anus and its neighborhood should be washed with salt water before the injection is administered.

Bismuth acts very favorably. Moderate cases of diarrhœa will usually show its effect very soon. Doses of from ½ to 2 or 3 grains (0.03–0.20), given every two or three hours, will act very favorably indeed. In those cases in which the diarrhœa has lasted for a long time, and a large surface of the intestinal tract is certainly implicated, the doses of bismuth should be large in order to be certain of immediate contact of the drug with the sore surface.

A final indication is the depression of the hyperæsthesia of the general system and of the intestinal tract in particular. The effect of opium is very probably an anatomical one, and brought about in such a manner that a combination takes place with the nerve plasma. As this is so much softer and succulent in the child than in the adult, the effect is so much stronger. There have been authors who condemned the use of opium altogether, which certainly, is incorrect. The doses should be small, and they may be repeated frequently. Administered in this manner, opium can be used with perfect safety both internally and in an enema. For, when the doses are small, it is possible to stop before an overdose has been given. One of the rules for giving opium is this—the child should not be waked up for the purpose of taking the medicine. Opium does not always act as a depressant, but sometimes as an excitant. This difference in the effects produced by the drug are well known. Very small doses will act as an excitant, while relatively large ones will act as a depressant. The exciting doses, will, when accumulated, also show their constipating effect, and whenever there is fear of collapse, it is safer to give $\frac{1}{200}$ of a grain (0.0003) every half-hour or hour, than to administer $\frac{1}{50}$ of a grain (0.0012) every two hours.

Alcohol.—Small and frequent doses will certainly stimulate the nervous system, digestion, and circulation, and they also stimulate the skin and increase perspiration. Alcohol, given in this manner, certainly arrests fermentation. Moreover, it takes the place of food, and will act favorably as food when no solid carbo-hydrates are tolerated by the intestinal tract. As it is absorbed in the stomach, so does it protect the intestinal tract. It has been found that, when only small quantities of milk and pure alcohol and water are given as food, the body increases in weight. But it is absolutely necessary that the alcohol or the alcoholic preparation should be pure. Fusel oil will dilate blood-vessels, produce and increase congestion, and prove dangerous. Where no good brands or whiskey can be procured, it is better to use alcohol in substance diluted with water.

Finally, it is necessary to reduce the amount of secretion taking place from the surface of the intestinal tract. For that purpose astringents may be used, such as alum, lead, tannic acid, pernitrate of iron, and, what has already been spoken of, nitrate of silver. In all those cases in which the stomach participates in the process to any considerable extent, almost any astringent will prove ineffective. Neither alum nor lead nor tannic acid may do otherwise than irritate the stomach, and it will be necessary to depend altogether upon nitrate of silver, or better upon bismuth, for the purpose of meeting two indications. To fulfil several indications at the same time, it is often good practice to combine remedies.

The main indications are to neutralize acids, to reduce nervous irritability, to arrest secretion, and to change the condition of the surface of the catarrhal mucous membrane.

For that purpose, in the generality of cases, I combine bismuth, opium, and chalk according to the following formula :

℞ Bismuth subnit..................................	gr. i. (0.05)
Prepared chalk............................	grs. ij. (0.10–0.20)
Dover's powder..................................	gr. $\frac{1}{4}$ (0.02)

This combination is suitable for a baby ten or twelve months of age, and the dose can be repeated every two hours. In all those cases in which acid is very abundant, it is necessary to increase the doses of antacids without necessarily giving large doses of opium

Whenever it is necessary to stimulate, and alcohol alone does not meet the requirements, resort may be had to hot bathing. This is especially serviceable in those cases in which the surface is cool and the temperature of the body, measured in the rectum, is pretty high. A hot bath in which the child may be kept for two or three minutes will restore some warmth to the surface, dilate blood-vessels, reduce temperature, and act as a nervous stimulant. To relieve intestinal pain, plain warm fomentations ; to relieve heat, cold applications are sufficient.

Camphor stimulates the heart, and reduces temperature, and may be used internally or subcutaneously according to the necessities in the case.

For subcutaneous injections camphor may be dissolved in either oil or alcohol. The effect derived from camphor as a stimulant is not permanent, but still very much more permanent and steady than that produced by carbonate of ammonia.

The dose may be from ¼ to ½ a grain (0.015–0.03) every hour or two, when only a moderate stimulation is required. In urgent cases it may be given in doses of from five to ten grains (0.3–0.6) in the course or an hour, and usually the effect will be favorable.

It is, however, only in cases in which real collapse is present that doses of five or ten grains will be required, and it may then be administered dissolved in alcohol, and with or without musk.

There is no remedy that will act more favorably in conditions of great debility and collapse—collapse with or without spasmodic symptoms—than musk. It is true it is scarce, very frequently spurious, is expensive, and must be given in larger doses than usually recommended. But in cases of collapse, doses of five or ten grains (0.3–0.6) should be given at once, and should be repeated every half-hour or hour. More than two or three such doses will not be required to yield a result.

The dysenteric miasma* being unknown, the rules commonly obeyed in the hygienic management of all miasmatic and infectious diseases are valid in an epidemic of dysentery as well. Streets, water-closets, and sewers must be disinfected effectively, dwellings and hospital wards vacated from time to time, and individuals protected by frequent and careful ablution and the disinfection of clothing. Special care ought to be taken lest many dysenteric patients be admitted to children's or, in fact, all hospitals. Their number ought to be limited when they are admitted to special wards, and smaller than that of typhoid fever patients when received in general hospitals. Dysenteric evacuations are to be disinfected and removed, soiled bed-linen disinfected and washed.

Those in relative health are to give the greatest possible care to their digestive organs. Indigestible food must be avoided rigorously during an epidemic. Vegetables containing a large percentage of cellulose, salads, cabbages must be refused to children of even advanced age, and even ripe fruit ought to be refused as a rule. Even healthy children of three or five years will, now and then, without apparent cause, under normal circumstances pass soft peas or whortleberries, though well prepared, while there is no apparent change along the whole length of their alimentary canals. Animal milk, too, requires great care when given to younger children, nay, common cases of diarrhœa require that the amount of milk given them should be rescinded. Cow's milk, when unmixed or mixed with water only, acts in part as an irritant during an epidemic or individual disposition to diarrhœa. In regard to that, I have heretofore laid down the rules according to which cow's milk, unless there are positive indications for total abstinence, can be rendered digestible. More: great care ought to be taken lest the physiological constipation resulting from the unusual length of the colon descendens and the doubling and even trebling of the sigmoid flexure should act as a cause of disease. At all events, one or two enemata must be given daily. They are also, and even more so, required where habitual constipation depends upon rachitical debility of the muscular layers of the intestinal tract. When there is an actual indigestion from either alimentary or atmospheric causes, a purgative is required. I prefer a single effective dose to small refracted administrations, but no drastic to a child of one or two years. Five or ten grains (0.3–0.6) of calcined magnesia, three or six grains (0.2–0.4) of calomel, with an alkaline addition, one or two teaspoons of castor oil, half a teaspoonful or less of the fluid extract of rhamnus frangula, act both effectively and agreeably. Pain and tenesmus may be prevented by the addition of codein, or extract of opium, both of which have less of the constipating effect of the gum, or by extract of hyoscyamus. I need not add that in times like these the usual care is to be taken of the general health. Woolen or canton flannel undergarments ought to be changed every morning or night, so that they have ample time to get rid of the accumulated moisture. The stockings also ought to be of wool or thick cotton, must cover the entire leg and part of the thigh, and be changed frequently.

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* Compare the author's essay on Dysentery in Gerhardt, Handb. d. Kinder-Krankheiten, *Vol. II., 1878.*

When the disease has made its actual appearance, the diet requires great attention. Altogether it would be wrong to force nourishment into a patient whose appetite is impaired and fever high in the very beginning of the disease. But there is hardly another disease in which consumption and emaciation are so rapid by both actual expulsion of substance and nervous exhaustion as in dysentery. Therefore, the little patients ought to be supplied soon with a certain amount of food. Barley-water with milk, or barley-water with milk and the whites of eggs, will suffice for a long time, and will prove digestible; if not, small doses of pepsin with muriatic acid, or lactopeptin, or bismuth, or pancreatin, or milk prepared according to the plan of Dr. Rudisch, will enhance their digestibility. In some cases, broiled or raw beef, in small quantities, but frequent doses, is well tolerated, provided that the stomach and small intestines have not participated in the actual morbid process from the commencement. This happens very often, indeed. In every feverish disease, and mainly such of the abdominal organs, saliva is reduced in quantity, and the stomach less liable to digest. Besides, a large tract of mucous membrane is sore or inflamed, and liable to be irritated by passing solids, meat fibre, casein, cellulose. Whenever the tongue is coated, the region of the stomach irritatable, it is best to refuse even raw beef and milk, until the tongue begins to be more normal. Nay, even Leube's beef solution, one of the sheet-anchors during recovery, ought to be dispensed with, except in conditions of great urgency. Beef-tea is contraindicated. I emphasize that fact, as one of the first general advices in the practice of many of us is the administration of beef-tea, in regard to which, I refer to such remarks as I made before. All nourishment ought to be tepid. Ice increases peristaltic motion and gives rise to pain and tenesmus. So do effervescent beverages, Selters, Apollinaris. In mild cases, particularly in the beginning, stimulants, either alcoholic or other, are not required. But I do not share the opinion of such as forbid them absolutely; on the contrary, they will prove both pleasant and effective during the periods of increasing debility and convalescence. In these conditions, from half an ounce to two ounces (15.0–60.0) of brandy or whiskey daily, in small and frequent doses, and largely diluted with mucilaginous or farinaceous fluid, are very salutary, not to speak of the cases of great debility and actual collapse. In such conditions, there is hardly a dose of alcoholic or other stimulants, which, where temporarily required, ought to be considered too large. Ten grains of camphor and four ounces of brandy administered to a child of two years in such a condition, during a single hour, I know to have saved its life. It is better for children to take in the course of one day three or six ounces of brandy, ten or twelve grains of camphor, or twenty or thirty grains of musk, than it is for parents to bury them on the next,

The regulation of the surrounding temperature is of great importance, even in the mildest cases. What appears a mild case to-day may be a serious one to-morrow. The temperature of the room need not be above 70° F., but the little patient ought to be in bed and well covered. His linen must be warmed before being put on, changed frequently, the body often washed, particularly the anus; bed-pan and evacuations disinfected, windows opened. The feet have a constant tendency to get cool and ought to be warmed constantly. One tepid bath at least ought to be taken daily; for no other purpose the patient must leave his bed. Tepid fomentations will alleviate colic, warm injections tenesmus. Of these latter I shall have to say more.

In many mild or moderate cases, this dietetic treatment of an attack of dysentery may suffice, but its effect is not to be relied upon solely, for at any moment medicinal treatment may become urgently indicated. Personally, I almost feel like counting the administration of a mild purgative in the first commencement of a dysenteric attack among the dietetic indications. A copious evacuation from the bowels appears to be an essential aid in procuring a mild course for the incipient morbid process. When, after all, a rapid recovery can no longer be expected, after these dietetic measures, the indications for treatment are plain. The local morbid process is to be inhibited, the peristalsis to be moderated, the irritability of the intestines to be reduced to a minimum, and the morbid products removed both as quickly and gently as possible.

As I said before, I like to begin the treatment with a purgative. Calcined magnesia (with or without some salicylate of soda, according to the condition of the stomach), castor oil with opium, the fluid extract of senna or rhamnus frangula, or from three to eight grains of calomel, to be followed by a dose of Dover's powder. I am well aware of the objections to mercury, and know of but few indications for its administration except in syphilis. Its protracted use, although it is not so apt to give rise to stomatitis as it is in adults, may still prove so deleterious in its effect upon the general system that this application has been greatly rescinded in the last twenty years of my practice. The objection alluded to is, however, more valid in regard to small and frequent doses than to single larger ones, and cannot contradict, therefore, the warm recommendations of calomel on the part of, particularly, English physicians. Still, purgatives are indicated in the commencement only of dysentery, not through its whole course, as has been advised in the dysentery of adults. In the latter, accumulations of feces of old date are not at all rare, in fact there are very few adults where they may not be met with. In children the intestines are smaller, the contents more liquid, relaxations and diverticles rare, and accumulations less frequent and less copious. Thus, though adults may require purgatives in the course of a dysenteric attack, children, as a rule, do not require such a repetition. But lately a young friend was, by the advice of a consulting physician, awed into giving a purgative in the third week of a dysentery doing well on bismuth and opium; to some disadvantage. Where, however, an indication appears to arise, the purgative ought to be castor oil or magnesia, no longer calomel or a drastic.

We know of many recommendations of emetics. Their effects were described as revulsive; their general and principally their diaphoretic powers were praised. Still I think that a warm bath and warm beverages, while they are just as effective, are less violent. Ipecacuanha has been recommended more than any other remedy of that class, but not for its emetic effect. On the contrary, McLean, Woodhull, and others insist upon avoiding the nauseating effect. McLean administers a hot bath, and a dose of opium or chloroform. This is followed by a dose of twenty-five or forty grains of ipecac; he allows his patient to suck ice, but no drink for two or three hours, and uses sinapism or oil of turpentine as derivants. A smaller dose of ipecac is given after eight or ten hours. Sometimes another dose of eight or twelve grains is required on the following day. Recovery is said to set in soon. This ipecac treatment is reported to have resulted, amongst the military in England, where it was first introduced, as "radix anti-dysenterica," in better statistics than the former routine treatment with mercury and depletion. The latter I cannot recommend. Except the anus, no tangible locality has blood-vessels connected with those of the diseased mucous membrane. There is no indication for leeching the abdominal surface as long as there is no complication with peritonitis. Generally the consumption of blood is so large in dysentery that saving blood is more advisable than taking.

Great sensibility of the left hypogastric region and heat will be alleviated, however, by the application of ice. But it must not be forgotten that very young infants bear ice but a short time, whether applied to head or abdomen. I advise to watch the effect of the application either of the ice bladder or the ice-cold cloth. Now and then, even in adults, we meet with an idiosyncratic incompatibility with cold. It has to be taken into account. Sometimes warm applications of either water or poultices prove more efficient in regard to the two indications, which consist in alleviating irritation and reducing temperature. Sometimes a simple warm application, which may be changed every few hours, or a cold application which is permitted to get warm on the skin, will result in reducing both pain and temperature, as both physiological laws and therapeutical experience may lead us to expect.

Opium (and its alkaloids, morphia and codeia) is invaluable in dysentery, notwithstanding the contrary opinion of a number of authors. The objection to its use is decidedly exaggerated. Such accidents as have been reported in the journals to result from its administration must be attributed to the fact that either the dose was absolutely or relatively too large compared with the idiosyncrasy of the little patient. Dysentery both requires and tolerates larger doses of opium than an average diarrhœa. In this respect this disease stands abreast with peritonitis. The main indications are to relieve pain, reduce peristalsis, and diminish the copious serous secretion; no other remedy fulfils all of them so well. For this purpose it ought to be given internally; for enemata containing opium may act favorably, but the more intense the tenesmus the less reliance can be placed on its effect, and the amount of the opiate thus brought into real action cannot be estimated. From amongst the opiates I prefer a tincture, or the wine, or opium in substance, or Dover's powder; but rarely have I injected morphia under the skin. The effect of the drug is easily watched and controlled, by commencing with moderate doses, not repeating them too often, and being guided by the effect obtained. If opium is to be replaced, opium with hyoscyamus, or with belladonna, or hyoscyamus or belladonna alone, may take its place temporarily.

After the purgative administered in the first stage of the disease has proved efficient, astringents ought to be resorted to at once. They may either be given in combination with opium or separately. They are expected to pass wholly or partly through the entire length of the intestinal canal, thus coming in contact with the inflamed and ulcerous mucous membaane. Amongst those eligible are tannin, gallic acid, and vegetables containing the same (ratanhia, cinchona, catechu), besides subacetate of lead, nitrate of silver, and pernitrate of iron.

The daily doses of tannin range from eight to fifteen grains, (0.5 to 1.0) with opium or Dover's powder, lead in doses somewhat smaller, nitrate of silver one-sixth of a grain to one grain (0.01 to 0.06) in plenty of water, liquor pernitratis ferri fifteen to fifty minims, in a mucilaginous or farinaceous vehicle. The single doses ought to be but small, but their administration frequent. There is another remedy which, in my estimation, stands very high, viz., the subnitrate or subcarbonate of bismuth. Not only does it cover and protect the mucous membrane, but it also has a decided anti-fermentative effect. Thus it is surely indicated in irritated conditions of the mucous membrane; it seldom fails when given in sufficient doses. There is no harm in sometimes giving it in such doses that part of the introduced material will pass through the entire length of the intestinal tract without undergoing decomposition. As its taste is not disagreeable, it may be given together with tannin and opium; the daily dose ought not to be less than one drachm or a drachm and a half (4.0 to 6.0). At the same time the passages ought to be examined as to their reaction. Abundant acid, so frequently found in the slightest intestinal anomalies, requires the additional administration of alkalies. In most cases carbonate of lime is preferable to either magnesia or the carbonate or bicarbonate of soda, the salts of both of which are apt to increase diarrhœa. Sometimes, particularly when the stomach can be relied upon, the salicylate of soda may be added to the internal treatment. Besides the favorable effect of the soda in the intestinal tract, the salicylic acid may prove beneficial both by its anti-febrile and disinfectant action. In regard to the use of lime-water, I refer to some previous statements.

At the same time accidental complications may yield their own indications. McLean reports many cases of complications with malaria, necessitating the use of quinia; others cite scurvy requiring antiscorbutic treatment.

When the catarrhal or inflammatory form of dysentery be complicated with diphtheritic deposits or degenerations, either superficial or deep-seated, or when large portions of mucous membrane be expelled and ulcerations be developed, the indications for energetic treatment become more and more urgent. Local treatment is required to astringe, to disinfect, to produce new granulations. For that purpose astringents, carbolic and salicylic acid may be resorted to. To what extent local treatment can be useful, Dr. T. G. Thomas has proved but lately in a very tedious and protracted case. A lady suffering from chronic dysentery through many years, and reduced to the lowest possible degree, recovered within a short time under the repeated applications of a small amount of concentrated nitric acid made to the surface of the ulcerated rectum through a speculum.

The local treatment requires the use of enemata. Their indications vary. They are to evacuate the bowels, or to reduce the irritability of the diseased intestine, or to accomplish an actual cure. These indications cannot always be fulfilled separately; sometimes two, sometimes all three can be fulfilled at the same time. The nature and quantity and the temperature of the liquid to be injected depend in part on the end aimed at, in part on the irritability of the individual intestine. Sometimes the bowel objects to the introduction of small amounts; sometimes, however, large qantities are tolerated very easily indeed. To introduce small amounts, the selection of the syringe is a matter of indifference. To inject large quantities, however, undue pressure and local irritation must be avoided. Thus the fountain syringe alone will answer; it ought to hang but a trifle above the the level of the anus, say from six to twenty inches. The temperature of the liquid is not always a matter of great importance. Some recommend the injection to be ice-cold, some, however, tepid; both are frequently recommended as panaceas. But the practitioner will soon ascertain that some bear and require the one, some the other, some indeed very hot ones.

In my experience, for the large majority of patients tepid injections answered best. Not seldom is the intestine in such a condition of irritation that even small quantities of a very cold fluid are expelled at once. And again, there are cases in which enormous amounts of either cold or warm water are readily received. To accomplish the purpose of evacuating the bowel, plain water will often suffice, but one per cent. solutions of salt in water will usually prove more acceptable. Additions of bitartrate of potassa, or castor oil, have proved so uncomfortable in my hands that I have discarded them long ago. However, when the secretion of mucus on the rectal mucous membrane was very large, one or two per cent. solutions of bicarbonate of soda answered very well indeed. For the purpose of clearing the intestines, either of feces or the morbid products, a single enema is insufficient. It ought to be repeated several times daily. When much mucus is secreted and tenesmus intense, it may be applied after every evacuation. In many cases the substitution of flaxseed tea or mucilage of gum acacia will prove advantageous. I had to continue them for weeks for both their evacuating and alleviating effect. When, however, the latter effect alone is aimed at, small quantities will usually suffice. An ounce or two of thin mucilage, or starch-water, or flaxseed tea, with tincture of opium, or better, extract of opium, prove very comforting. Glycerine in water has been recommended for the same purpose. The former alone, or but slightly diluted, irritates, nay cauterizes. It will require close judgment and individual experience to ascertain the degree of dilution.

When a local curative effect is aimed at, injections of small quantities will be found deficent. As the local lesions are often extensive, the amount to be injected must be pretty large. Almost always astringents are required. Sulphate of zinc, of alumina, subacetate of lead, nitrate of silver, tannin, chlorate of potassa, ergotin, salicylic and carbolic acids, and creasote have been recommended. Of the more common astringents I prefer alumina or tannin in one per cent. solutions. Creasote answered well in solutions of one-half of one per cent. Salicylic acid resulted more frequently in pain than in benefit. Carbolic acid in solutions of one-half of one per cent. has proved very beneficial, but I have learned long ago to be very careful in regard to its administration when I observed a case of poisoning with that substance. A young man suffering from chronic dysentery was to be treated with injections of carbolic acid in a one per cent. solution. As it was expected that but a limited quantity would be tolerated before expulsion, no amount was specified. The intestine, however, being in a paralytic condition, received enormous quantities, until finally ten drachms (40.0) of crystallized carbolic acid disappeared in his bowels. That want of caution came near destroying the patient.

Injections of nitrate of silver may prove very useful in cases not quite acute. Before the solutions of a quarter of one per cent. or one, or two per cent. are injected, the intestine ought to be washed out with warm water without salt. After the injection has been made, it ought to be neutralized with a solution of the chloride of sodium; it is still better to wash the anus and the portion of the rectum within easy reach with that solution before the medicinal injection he made. For even the mildest solutions are liable to give rise to intense tenesmus, when no such care has been taken.

In chronic cases, where the ulcerations are but few, or in the lower portion of the bowels only, small quantities suffice. But more acute cases and extensive lesions require large injections, the patient being on his side, or in the knee-elbow position. In a number of cases, both mild and severe, where neither the usual astringents nor nitrate of silver appeared to answer, I have been very successful when resorting to injections of subnitrate of bismuth. The drug is mixed with six or ten times its amount of water; of this mixture from one to three ounces (30.0–100.0) are injected into the bowel which has been washed out previously, twice or three times daily. The success was satisfactory, though a large portion of the injected mixture was soon expelled.

Suppositories containing the above substances may prove beneficial. But in order not to irritate they must be so soft as to melt readily. They may lways contain some opium. But its admixture is not always sufficient to relieve the irritability of the rectum. For to accomplish this end, opium must at least begin to liquefy and to be absorbed, and absorption cannot be relied upon except where a part, at least, of the mucous surface is in a tolerable state of integrity.—ABRAHAM JACOBI.

DIPHTHERIA.—*Definition.*—Diphtheria is an acute infectious disease in which there is a tendency to the formation of false membrane on mucous and abraded surfaces, chiefly of the fauces and respiratory tract, accompanied by considerable constitutional disturbance.

Symptoms.—After an incubation period, which varies greatly, but which is probably from twenty-four hours to ten days, shivering and vomiting set in, and the temperature becomes increased. The throat becomes sore, and there is some amount of stiffness about the neck. The fauces become of a dark-red color, the tonsils swollen, and at the end of two days from the beginning of the disease a quantity of minute white points appear on the surface of one or both sides of the fauces. As these spots increase in number they coalesce and form a thick, yellowish-white membrane. This sometimes consists of a single piece, but is often scattered over the surface in separate patches. The cervical glands become enlarged, the tongue coated with white or brown fur, the pulse and temperature increased, and the urine albuminous.

In the next stage the membrane separates, often leaving unhealthy sloughing ulcers.

In this stage recovery may take place, or death may result from exhaustion; during any period of the illness asphyxia, resulting from the production of false membrane in the larnyx or bronchial tubes, may be fatal. In the course of the disease a roseolous rash may appear over the body. This is not different from the roseola which appears with other acute diseases.

Convalescence after diphtheria is very slow; often paralysis of groups of the muscles shows itself within six months from the beginning of the attack.

Diagnosis.—Diphtheria may be confounded with (*a*) scarlatina, (*b*), tonsilitis, (*c*) herpetic sore throat. The points of difference between these diseases is shown in the following table:

DIPHTHERIA.	SCARLATINA.
Throat of deep red, which is not uniformly distributed.	Throat of bright red, which is uniformly distributed.
Patches of thick yellow membrane on any portion of fauces.	Large white, thin, irregularly shaped exudations on fauces.
Tonsils unequally swollen.	Both tonsils equally swollen.
Tongue coated with white fur.	Tongue furred, with large papillæ.

HERPETIC SORE THROAT.	TONSILLITIS.
Throat less red than in scarlatina or diphtheria.	Throat less red than in scarlatina or diphtheria.
Small white points on tonsils.	Small, thin, yellow exudation points over surface of tonsils.
Tonsils unequally swollen.	Tonsils unequally swollen.
Tongue furred.	Tongue furred.

Prognosis.—Diphtheria, under any circumstances, is a disease in which a guarded prognosis should be given. During the whole course of the disease symptoms may arise which are the precursors of a fatal termination.

Those cases are most serious which occur in young children, when there is a tendency to extension of the membrane, when an alteration in the voice betokens affection of the larynx, or when the powers of the patient begin to fail early.

Treatment.—The removal of the false membrane is of no avail; antiseptic applications are, however, very useful, and the patient's powers should be most carefully supported. The internal administration of the tincture of the perchloride of iron is valuable, both for its local action as an antiseptic and for its hæmatemic properties. If the larnyx becomes affected and there be much local obstruction to breathing, tracheotomy should be at once resorted to, for it is of no use to wait until the patient's powers are almost exhausted. The operation is itself a trivial one, and should therefore not be postponed.—MALCOLM MORRIS.

DIPSOMANIA—*See Alcoholism.*

DISEASE, Epidemic Anomalous—*See Dengue.*

DISLOCATIONS.—Three kinds.—1, traumatic; 2, congenital; 3, spontaneous. In traumatic, the capsule is almost always ruptured.

COMPLICATED DISLOCATIONS.—In these there is either fracture, or wound of skin, or of large vessel, or of nerve, or several of these misfortunes.

Causes of dislocations.—1. External force, which is (*a*) direct or (*b*) indirect. 2. Muscular action (*e. g.*, usual in dislocation of lower jaw). *Symptoms.*—1. Altered form of joint. Compare two sides of body. 2. Line of direction of misplaced bone does not pass through the articular surface of the other bone. 3. Lengthening or shortening of limb. 4. Altered position of limb to trunk, *e. g.*, projection of elbow from side. 5. Abnormal distance between certain prominent points of skeleton, *e. g.*, between internal condyle and olecranon. 6. Ecchymosis (rarely distinct at first, sometimes absent). 7. Pain. 8. Inability to move the limb. Manual examination must finally settle the question in most cases, showing the articular cavity empty and the head of the bone at some other point. Anæsthesia may be necessary for a diagnosis, because of soft parts being so swollen and tender. A soft crepitation sometimes, caused by rubbing head of bone on torn capsular ligaments and tendons, partly from the compression of firm coagula. *Diagnosis.*—1. From dislocated articular fracture. Easily made by an attempt at reduction. The latter is easily reduced, but returns at once; 2, from contusion and sprain. Examine carefully: 3, from relaxation of the capsule in paralyzed limbs. Here consider the history, and make a careful local examination.

Capsular opening is of variable size. Escaped head of bone does not always remain immediately opposite it. Occasional spontaneous reduction by muscular action.

Mechanical obstructions to reduction.—1. Contraction of muscles. Head of bone may be caught between two contracted muscles. 2. (A far more frequent obstacle), a small capsular opening, or its occlusion by the entrance of the soft parts. 3. Certain tensions of the capsular or strengthening ligaments. *Reduction.*—Easiest immediately after the injury. Later, anæsthesia often required. Manœuvres depend on joint affected. Usually, the assistants make the motions while the surgeon himself manipulates the head of bone. Often everything depends on correct anatomical knowledge. Multiplying pulleys, Bloxam's dislocation tourniquet; these things now only used under anæsthetics; when they involve the application of straps round the chest, they make anæsthesia more dangerous. If too great violence is used—1, patient may collapse; 2, limb may mortify from the pressure; 3, great vessels or nerves may be ruptured; 4, rupture of other soft parts, as skin or muscles; 5, fracture of bone; 6, limb may be torn off. These accidents occur mostly in attempting to reduce old dislocations. The results of pressure best prevented by fastening the straps over a wet bandage previously applied from below upwards. Nerves and muscles are most liable to rupture when adherent to deep cicatrices. Use of Malgaigne's dynamometer, to measure force employed. *After-treatment.*—Reduce synovial inflammation, which always ensues, by moist bandages and cold compresses. Passive motion; in shoulder, not for a fortnight; in elbow and hip, earlier. Too early motion may cause:—

Habitual Dislocation.—When a joint has been several times dislocated it becomes extremely liable to dislocation. *Treatment.*—Long rest of the joint.

Irreducible Dislocation.—Restore the movements as far as possible by passive and active exercise, otherwise the muscles atrophy. The anatomical changes are as follow:—The extravasation is reabsorbed; the capsule folds together and atrophies; the soft parts about the misplaced head become infiltrated with plastic lymph, and transform to cicatricial, firm connective tissue, which partly ossifices; the cartilage metamorphoses into connected tissues and adheres to the neighboring parts; the surrounding muscles suffer considerably from molecular disintegration and fatty metamorphosis. *How long Dislocations are Reducible.*—Depends on joint. Ball and socket much longer than hinge-joints. Shoulder may be reduced after years. Hip, after two or three months, very difficult. Tenotomy has been employed, but not very successfully; for the chief obstacle is the firm adhesion of the head of the bone in its new position. Is reduction of such old dislocations desirable? Often preferable to let patient simply exercise limb well in its new position. Breaking up adhesions about the head of the bone by rotating it forcibly (*vide* Anæsthesia) may facilitate this. Pressure on brachial plexus may require excision of head of humerus.

Complicated Dislocations.—1. With fracture. Always attend to this, and apply an apparatus till it has united, changing it and putting the joint in a new position, say every ten days, to prevent stiffness. 2. With compound fracture. Resect joint, or try to save it, using some thoroughly antiseptic method. If there is considerable crushing and tearing of the soft parts amputation may be required.

Congenital Dislocations.—Distinguish from those caused during parturition. Occur in most of the joints of the extremity, but especially in the hip. Head of bone above and behind acetabulum. Generally readily replaced. Peculiar wabbling gait. If the dislocation is one-sided, patient, lying on the back, turns the foot inwards. Acetabulum is too shallow, and in adults, filled with fat. Ligamentum teres, if it exists, is abnormally long. Head of femur too small. Articular cartilage usually completely formed. Capsule very large and relaxed. Cure mostly impossible. *Causes.*—Perhaps excessive quantity of fluid in joint, at very early period of uterine life. Perhaps also extreme adduction in uterine life. *Result.*—In course of time, spinal curvature. *Treatment.*—It has been recommended that the thigh should be kept for a very long time in a position of abduction. *See Med. Rec.*, 1880.

Dislocation of Ankle.—Four directions: outwards, inwards, backwards, forwards. 1. *Outwards.*—Accompanied by fracture of fibula above outer malleolus and rupture of deltoid ligament, or fracture of inner malleolus. Same thing as "Pott's Fracture." Foot turned outwards. Depression over fracture of fibula. *Treatment.*—Dupuytren's splint (to inner side), or ordinary leg-splints. Keep foot well in, and sole at right angles to leg. 2. *Inwards.*—Accompanied by fracture of inner malleolus. Treat on same principle as Pott's Fracture, only keeping foot well out. 3 and 4. Dislocations backwards and forwards may be distinguished from fracture of leg bones by relation of malleoli to tarsal bones. After reduction, apply starched bandages and mill-board, or some other firm apparatus.

Compound Dislocation of Ankle Joint.—Requires amputation if tibial arteries be injured, or other important parts be much damaged. Otherwise, remove small fragments, clean, set, and dress. Primary excision of the joint occasionally advisable. Ankylosis pretty certain. Use antiseptic dressing.

Dislocation of Astralagus.—If simple, must be either backwards or forwards. Latter has an inclination either outwards or inwards. Dislocation directly outwards or inwards is always complicated with fracture of leg bones. Dislocation forwards most common. Complete or incomplete. Prominence of head of bone beneath skin in front of ankle. Malleolus of side towards which the bone is inclined projects. Danger of skin sloughing from pressure. *Treatment.*—Flex knee to relax gastrocnemii; extend foot and push astralagus into its place. This is tolerably easy in partial dislocation; but complete dislocation may require anæsthesia and a division of tendo Achillis. Dislocation backwards is very rare and difficult to reduce. *Compound dislocation.*—Except in the most favorable cases, reduction is not to be tried. The question lies between excision and amputation. Decide and treat on general principles. In simple irreducible dislocation, primary excision is not advisable. The bone may remain harmless in its new place.

Dislocations of Separate Carpal Bones, especially of os magnum, can be reduced by pressure, and generally require, for some time, apparatus to prevent recurrence.

Dislocation of Clavicle.—At the sternal end, three varieties, viz.: 1, forwards; 2, backwards; 3, upwards. Forwards most common; others very rare. The deformity is in each case so manifest that diagnosis is palpable. In dislocation backwards end of clavicle presses on trachea, œsophagus, and great vessels of neck. *Treatment.*—Extend shoulders backwards, and bandage to a splint applied to the back with a pad between splint and spine. Difficulty of keeping bone in its place. Truss to press on head of bone displaced forwards. At the acromial end, dislocation almost always upwards, but sometimes below acromion, or even below coracoid process. Reduction easy by pulling shoulders backwards. Here also difficult to keep bone in its place. Gutta-percha or leather shoulder-cap, with a pad over end of clavicle. Bandage in a line parallel to upper arm, over shoulder and elbow. Then bandage arm to side.

Dislocation of Coccyx may result from falls or during parturition. Reduce with the assistance of a finger in the rectum.

Dislocation of the Elbow:

I. Complete dislocation of radius and ulna: 1, backwards; 2, forwards. In the former there may be fracture of the coronoid process; in the latter, fracture of the olecranon; 3, inwards; 4, outwards. The latter two are rarely complete.

II. Ulna alone: backwards only.

III. Radius alone: 1, forwards; 2, backwards; 3, outwards; 4, partial forwards.

IV. Ulna backwards with radius forwards.

Injuries of elbow often obscured by great swelling. Following excellent directions, as to the points to be noticed in an injury to the elbow, are from Holmes (abbreviated): 1. Is there transverse fracture of humerus? 2. Longitudinal or partial fracture of lower end of humerus, *e. g.*, of condyles? 3. Distance between olecranon and internal condyles? 4. Fracture of olecranon? 5. Are motion and position of head of radius normal? 6. Do axes of radius and ulna correspond in direction?

Dislocation of both bones backwards: Prominence of olecranon; distance between it and internal condyle increased. Prominence of lower end of humerus below fold of skin at front of elbow-joint. (In fracture of lower end of humerus, the prominence of the upper fragment is above that fold). Fracture of coronoid process causes increased mobility, as well as crepitus.

Dislocation of both bones forwards: Arm is lengthened, and olecranon, unless broken off, is on a level with condyles.

Dislocation of ulna backwards: Head of radius can be felt normal; but olecranon is too far back from internal condyle.

Dislocation of radius forwards (most common of the three modes): Elbow somewhat flexed, and midway between pronation and supination. Further flexion, as well as supination, very limited; head of radius can be felt displaced. After reduction, very liable to recur, because orbicular ligament is ruptured. Not uncommon in childhood.

Dislocation of radius backwards: Head of bone can be felt behind external condyle.

Dislocation outwards recognized by manipulation.

Causes.—Falls upon elbow or hand. Half the cases occur in boys.

Reduction of Dislocations of Elbow.—Can often be effected by merely pressing the bones into position. Sometimes extension, and even anæsthesia, required. Dislocations two months old have been reduced, after breaking down adhesions by forcible flexion and extension. In dislocation of the radius, extend from the hand. Bending elbow across knee a useful method of reduction. *Compound Dislocations.*—Amputation seldom necessary.

DISLOCATION OF HEAD OF FIBULA.—Extremely rare.

DISLOCATION OF FINGERS.—Are not common, and may be reduced by extension. Amputation should never be done for compound dislocation, unless the finger be hopelessly crushed.

DISLOCATION OF HIP.—Four chief directions: 1, backwards and upwards on dorsum ilii; 2, backwards into sciatic notch; 3, downwards into obturator foramen; 4, inwards on pubes. Other varieties, *e.g.*, into perineum, are very rare. First form is most frequent. *Causes.*—The backward dislocations take place when a person is in a stooping position, and either falls heavily on his feet, or is struck by a heavy weight falling on his back. Dislocation into the thyroid foramen is caused by sudden and violent adbuction, and dislocation on the pubes by sudden and violent extension of the limb, especially if coincident with a blow on the back of the thigh.

Anatomy.—The anterior part of the capsule, including Y-ligament of Bigelow, remains wholly or partially unruptured in all ordinary dislocations, and thus limits the position of the bone, interferes with reduction by extension, and can be utilized in reduction by manipulation. The obturator internus is a strong tendinous muscle; and backward dislocations are on the dorsum ilii, or towards the sciatic notch, according as they escape from the acetabulum above or below that muscle respectively. In the lower dislocation, the head of the bone is superficial to the obturator internus. Fracture of the acetabulum not uncommon, especially in dorsal dislocation.

Symptoms.—1. Dislocation on dorsum ilii. Hip looks widened. Peculiar position of limb; rotation inwards; slight flexion of both hip and knee; axis of thigh intersects lower third of sound thigh; ball of great toe rests on instep or ankle of other foot; heel raised. Abduction and external rotation impossible; stiffness and immobility under chloroform; head of bone makes a prominence in its new position; trochanter is above a line between ant. sup. spine of ilium and tuberosity of ischium (Nélaton's line). Shortening, one, two, even three inches. 2. Dislocation in sciatic notch.—Symptoms like those of dorsum ilii dislocation, only less marked. Axis of thigh across opposite knee; ball of toe on ball of other great toe. Shortening, half to one inch. 3. Dislocation into thyroid foramen.—Body bends forwards; foot points slightly outward; a hollowness takes the place of the trochanter. Lengthening, two inches. Head of femur perhaps discoverable in its new position. 4. Dislocation on pubes.—In this and the other rarer forms of upward dislocation, head of bone can be felt in its high position; flattening of hip; abduction and eversion. Shortening one inch.

Diagnosis.—Of dislocation on dorsum ilii from impacted fracture of neck of femur with inversion. Under anæsthetics, the former shows immobility, the latter mobility. In the former the trochanter is behind, in the latter it tends to lie below the ant. sup. spine of ilium.

Reduction.—Each kind of hip dislocation can be reduced in two ways, viz., extension and manipulation. Extension method is partly based on the idea that muscular contraction is the chief difficulty. But it is not so. The main resistance proceeds from strong ligaments, and sometimes from too small a hole in the capsule. Hence the advantage of manipulation. Dislocation on dorsum ilii.—1. Extension. Apply pulleys just above condyles of femur, and extend knee across lower third of opposite thigh; fix pelvis with perineal band. 2. Manipulation.—Place patient on back, and give anæsthetic completely; grasp knee and foot; flex well both knee and hip, adduct thigh, rotate outwards, and suddenly bring down the limb into a straight line with body. If this fail, try again and again, or rotate inwards instead of outwards. Dislocation towards sciatic notch.—1. Extension. Place patient on sound side; apply perineal band and pulleys; flex limb, and draw it across opposite thigh. 2. Manipulation. Same proceedings as in dislocation on dorsum ilii. Dislocation into thyroid foramen.—1. Extension. A pelvic band pulls pelvis towards sound side. A perineal band, working beneath it, is connected with pulleys which extend upwards and outwards from the injured hip. The surgeon grasps the ankle of the dislocated limb, and dragging inwards, thus prises the femur into the acetabulum. Instead of the pelvic and perineal bands, the bed-post may be placed in the patient's fork, and used as a fulcrum. 2. Manipulation. Flex hip, abduct slightly, rotate strongly inwards, abduct and straighten. Dislocation on pubes.—1. Extension. Extend limb, well abducted, downwards and backwards. At same time, pull head of bone outwards by a towel round thigh just beneath groin. 2. Manipulation. Pull strongly on thigh in line of axis of femur, at same time bending it on the abdomen; rotate inwards, and bring down into a line with body; or employ same manœuvres as in thyroid dislocation.

Old Dislocations.—Reduction is tolerably safe to attempt up to two months. Afterwards, danger of inflammation of joint, or fracture of femur.

Dislocation with Fracture of Femur.—Try to push head of bone into place, or let bone unite, and then, in sixth week, attempt reduction.

DISLOCATION OF LOWER JAW.—Usually bilateral. *Causes.*.—Direct violence, or over-extension in gaping. *Symptoms.*—Bilateral.—Mouth widely open and cannot be shut ; saliva dribbles ; speech and deglutition almost impossible ; depressions where condyles ought to be ; prominences behind and beneath malar bones. Unilateral.—Symptoms less marked ; chin inclines towards sound side ; depression in front of ear only on side dislocated. *Mechanism.*—Two views. One that it is caused by the coronoid process locking against the malar bone. The second merely attributes it to excessive muscular action. *Prognosis.*—If left unreduced, a certain amount of motion returns, and the teeth can be made to nearly, if not quite, meet. *Reduction.*—Firstly, disengage condyle by pressing downwards with thumbs, guarded by a towel, in mouth behind last molar teeth. Secondly, push chin backwards and upwards. Congenital dislocation is generally accompanied by other signs of imperfect development. Subluxation is a kind of "catching" of the jaw, which the patient can easily remedy for himself. It occurs in young people of relaxed fibre. *General Treatment.*—Tonics and time.

DISLOCATION OF KNEE.—Five kinds : forwards, backwards, inwards, outwards, and dislocation of semilunar cartilage, called "subluxation."

The first four are unmistakable, from the obvious deformity. The lateral dislocations are most common and not complete. One or other condyle slips over to the opposite half of the tibial surface. Dislocation of the tibia forwards is dangerous from pressure on popliteal vessels by femur Subluxation is marked by sudden and severe pain attacking joint, which then remains semi-flexed. *Reduction.*—Extend and rotate slightly. Compound dislocation, except in favorable cases, requires amputation. Subluxation is reduced by flexion, followed when the patient is off his guard by sudden extension, combined with slight rotation Whilst manipulating press firmly with one thumb on any tender spot.

DISLOCATION OF METACARPAL BONES.—Rare, obvious, and easily reduced by extension.

DISLOCATION OF METATARSUS, if compound, may require amputation.

DISLOCATION OF PATELLA.—Four kinds: outwards (most common), in wards, edgewise, and upwards. *Causes.*—A blow on the edge of the patella, or sudden muscular action. *Signs, &c.*—1, Outwards (most common); patella rests on outer side of external condyle, generally with outer edge raised. 2, Inwards: most rare, almost unknown. 3, Edgewise: either inner or outer edge of patella is twisted into intercondyloid space, the bone standing on its edge. 4, Upwards; Ligamentum patellæ is always ruptured. Quadriceps extensor pulls patella upwards. *Reduction.*—In first two varieties flex thigh on abdomen; press outer or inner edge of patella, according as dislocation is outwards or inwards. The outer edge is thus raised and the bone freed, the quadriceps at once pulling it into position. Case 3 often presents great difficulties. Anæsthesia. Manipulation. Manipulation combined with bending leg and rotating it on axis of tibia. Forcible flexion. Sudden and violent extension made by patient himself. The cause of the difficulty said to be wedging of the superior angle of the bone in the intercondyloid space. Shun any divisions of tendons or ligaments. If dislocation be irreducible, wait, watch, and act according to the course taken by nature. 4, Upward dislocation; treat like fractured patella.

DISLOCATION OF LOWER ANGLE OF SCAPULA.—Query as to pathology. Slipping of latissimus dorsi or paralysis of serratus magnus. On latter supposition use strychnine endermically, Erichsen; electricity; orthopædic appliances.

DISLOCATION OF SHOULDER JOINT.—Five kinds: 1, downwards, subcoracoid; 2, downwards, sub-glenoid; 3, inwards, semi-clavicular; 4, backwards, sub-spinous; 5, upwards. Sub-coracoid is far the most common, sub-spinous very rare. *Causes.*—Predisposing—the natural shallowness and free movements of the joint, previous dislocation, male sex, old age. Exciting: Falls on shoulder, elbow, or hand; muscular action. To produce the dislocation backwards, the elbow has to be directed across chest when falling, or else twisted inwards. *Signs.*—Six common signs (Erichsen): 1, Flattening of the shoulder; 2, hollow under acromion; 3, apparent projection of this process, with tension of the deltoid; 4, presence of head of bone in an abnormal situation; 5, rigidity; 6, pain in shoulder. These resolve themselves into three simply: 1, head of bone is evidently absent from its place beneath acromion; 2, it is present elsewhere; 3, there are such signs as are common to dislocation of all joints, viz., stiffness, pain, &c.

1. *Sub-coracoid.*—Head of bone under or slightly internal to coracoid process. To feel it, raise the elbow. Elbow projects from side. Slight lengthening, real or apparent, of upper arm; rarely slight shortening. Stiffness: movement only possible antero-posteriorly.

2. *Sub-glenoid.*—Much like sub-coracoid, but head of bone more distinctly felt in axilla, elbow projects more, and there is lengthening, one inch. Marked symptoms of pressure on axillary vessels and nerves.

3. *Sub-clavicular.*—An extreme degree of "sub-coracoid." Prominen of head of bone beneath clavicle. Elbow projects backwards outwards.

4. *Sub-spinous.*—Head of bone felt beneath spine of scapula. Elbow outwards and forwards.

5. *Upwards.*—Always complicated with fracture of acromion or coracoid. Consequently, injury and swelling likely to be severe. Shortening. Crepitus and deformity.

Anatomy.—In the first three forms the inner and lower part of the capsule is torn, and, if the displacement be great, either the great tuberosity of the humerus, or else some of the muscles attached to it (supra and infra-spinatus and teres minor), have to give way. In sub-glenoid, the sub-scapularis also goes. In sub-spinous, also, the sub-scapularis is torn. In sub-spinous, head of bone lies between sub-scapularis and teres-minor; in sub-glenoid between sub-scapularis and long head of triceps; in subclavicular, on second and third ribs.

Diagnosis.—1. From fracture of neck of humerus. This fracture is never caused by anything but direct violence. Then there are the general differences between fracture and dislocation. Both injuries may occur together. 2. From mere paralysis of deltoid. Then, although there is flattening, still head of bone is easily felt in glenoid cavity.

Reduction.—By heel in axilla; by manipulation; by pulleys; by knee in axilla; by air pad in axilla; by extension upwards. *Heel in axilla.*—Patient lies on back. Surgeon sits with unbooted heel in injured axilla. Extension made either by himself or by assistants or pulleys. Anæsthesia. —Slight rotation of limb facilitates. Neither anæsthetics nor assistants necessary in most cases. *Manipulation.*—Bring arm with a sweep round in front of chest and face, then rotate inwards whilst bringing the arm down to the side again. This should be done by one hand of the surgeon, while with the other he tries to press the head of the humerus into into its place. Anæsthesia helps. *Pulleys.*—Anæsthesia. Caution: danger of rupturing nerves, axillary artery, &c. Forearm has been torn off. First apply a wet bandage to the arm, then put on a clove hitch over the bandage, above the elbow. Extension should be slow and patient. Counter-extension by a jack towel, or by surgeon's heel or knee. *Knee in axilla.*—Patient sits on a chair. Surgeon places one foot on chair and the knee in axilla. He then seizes the arm, extends a short time, and, lastly, steadying the shoulder with left hand, uses the knee as a fulcrum on which to lift humerus into its place. Or, as recommended by Flower in Holmes' System, the surgeon can place his back against a door-post and have extension made through the doorway by assistants, whilst he steadies the shoulders with both hands. Mr. Cock placed an air-pad in the axilla and bound the elbow firmly to the side. In three days the dislocation was found to be reduced. All other attempts had previously failed. Extension upwards can also be made with the heel against the shoulder; or extension outwards with counter extension from opposite wrist. Skey has shown that, owing to the great mobility of the scapula, the real direction of the extending force is much the same, whatever it may be apparently.

COMPOUND DISLOCATION OF SHOULDER.—Rarity. Question of resection uncertain. Antiseptic treatment. *Complications.*—1, With fracture of neck of humerus attempt reduction by manipulation, then treat fracture. If reduction impossible, put up fracture, and in sixth week (when union has taken place) again attempt reduction. If rupture of axillary artery occur, reduce dislocation first and then tie both ends.

DISLOCATION OF THUMB (METACARPO-PHALANGEAL JOINT).—Almost always backwards. *Signs.*—Thumb is bent back. Head of metacarpal can be felt projecting on palmar aspect, and base of first phalanx on dorsal aspect. Main obstacle to reduction is engagement of neck of metacarpal between two heads of flexor brevis pollicis, as in a button-hole. *Reduction.*—The efforts are directed to disengage from flexor brevis pollicis; bend the metacarpal joint of the thumb well into the palm of the hand, thus relaxing the muscle; now press the first phalanx of the thumb well backwards, *i. e.*, hyperextend it; at the same time pull the thumb downwards, *i. e.*, towards the tips of the fingers; lastly, flex the thumb (every joint) into the palm; if this fails the pulleys may be tried. Anæsthesia; subcutaneous division of one or both heads of flexor brevis, or lateral ligaments; passing a blunt hook through a small incision and hooking tendons of flexor brevis over head of metacarpal bone. After reduction, keep thumb bent towards palm for a day or two.

DISLOCATION OF WRIST.—Extremely rare; readily reduced. *Diagnosis.*—From Colles' fracture; in fracture the styloid processes go with the hand; in dislocation, they approach too near the finger-clefts.—C. B. KEETLEY.

DISSECTION WOUNDS.—Under this head we notice the lymphatic and cellular inflammations and blood-poisoning produced by absorption of animal poison from dead bodies. Bodies lately dead much more dangerous than those which have been long dead; bodies dead from erysipelas, peritonitis, puerperal and typhoid fevers, especially dangerous. Peritoneal fluid particularly poisonous after death from peritonitis. Not necessary that there should be a skin wound. Poison absorbable through hair follicles or through unbroken skin.

Signs and Prognosis.—Three grades of severity: In the first the symptoms, except slight fever for a few days, are trivial and almost confined to the limb poisoned; in the second, there is either severe cellulitis in the limb, or abscesses form in parts of the body beyond the limb, or both these troubles may be present. This grade is liable to pass into chronic pyæmia. The third grade is marked by violent and sudden symptoms of septicæmia and often terminates fatally in two or three days. The point of inoculation usually looks angry and purulent, and presents either a vesicle, a pustule, or a scab; it is painful; the lymphatics extending from it to the nearest glands are reddened, tender and sometimes surrounded by inflamed and even suppurating cellular tissue (phlegmonous erysipelas), these glands are tender and enlarged, and abscesses tend to form around them. Chills, rise of temperature, and other feverish symptoms come on within twenty-four hours. Symptoms such as these are common to almost every case, but the further course is variable. In the third grade of cases, within forty-eight hours, to quote Mr. Callender, "the patient, flushed, anxious, restless, even delirious, is in a hopeless condition, with prostration and rapid sinking." In the second grade, there may be extensive cellulitis or the formation of numerous abscesses near glands; but so long as the disease is subacute or chronic, and provided actual pyæmia does not occur, the prognosis is very hopeful. In these cases the spirits are usually very low. In the first grade, recovery takes place in a week or two or even in a few days.

Treatment.—If, while dissecting, the hand should be wounded, grasp it so as to check the return of venous blood, wash it, suck the wound, permit to bleed freely, and let a stream of cold water flow over it. If afterwards signs of local poisoning appear, give the limb complete rest, and the patient a country holiday, with instructions to avoid any kind of exertion, for excitement of the circulation appears to drive poison from the wound inwards. Cauterize the wound; a warm bath for the limb; generous diet; fresh air; tonics; purgatives; rest in bed for the severe cases; to properly rest a limb, splints are necessary; mill-board and starch apparatus; poultices. Open abscesses as they form.

DROPSY, General.—Dropsy is only a symptom or pathological condition, though often a very important one, associated with certain general or local diseases. It consists in an accumulation of serous fluid, which has escaped from the blood vessels, either in the subcutaneous or submucous cellular tissue, in serous cavities, or in the cellular tissue of certain organs; it may occupy all these parts at the same time. The following terms are used to express the site of the dropsy: Dropsy of the subcutaneous cellular tissue, if at all extensive, is named anasarca, if localized, œdema; hydrothorax signifies accumulation in the pleuræ; hydropericardium in the pericardium; ascites in the peritoneum; hydrocephalus in the ventricles of the brain or arachnoid cavity; dropsy of organs is termed œdema, *e. g.*, œdema of the lungs. When dropsy involves both the subcutaneous cellular tissue and serous cavities, it is said to be general.

It is necessary to mention certain morbid conditions which are known as spurious dropsies, but which really have no pathological relation to dropsy. They include ovarian dropsy, which is a cystic disease of the ovary; accumulations of fluid in the interior of hollow organs, as the result of obstruction at an orifice or of inflammation, such as dropsy of the uterus (hydrometria), or of the gall-bladder; certain serous effusions consequent upon inflammation, *e. g.*, hydrocele, and acute œdema of the glottis; dropsy of the kidney (hydronephrosis), which is either due to cystic disease, or more frequently, to obstruction of the ureter and consequent accumulation of urine and products of inflammation within the pelvis of the kidney, which gradually destroy this organ.

Etiology.—A dropsical accumulation is the immediate result either of excessive flow of fluid out of the vessels; or deficient absorption; or of both combined; in short, the balance between exhalation and absorption is in some way disturbed. This derangement may be due to the following pathological conditions:

1. Over-distension of the vessels in the different forms of congestion, but especially that dependent upon mechanical interference with the return of blood through the veins, is one of the most common causes of dropsy, which is then due both to an excessive escape of fluid from the vessels and to their diminished power of absorption. Obstruction to the circulation on the right side of the heart thus causes more or less general dropsy, beginning in the feet and ankles and extending upwards, which may also follow serous impediment in the lungs. Obstruction on the left side of the heart leads to œdema of the lungs, because the pulmonary vessels are then distended. Any local obstacle may originate limited dropsy. Thus interference with the portal circulation is followed by ascites; a clot in the principal vein of the arm or leg, or external pressure upon it, will give rise to œdema of the corresponding extremity. Hydrocephalus is chiefly the result of pressure upon the small veins returning the blood from the ventricles of the brain. Gravitation necessarily influences much the seat of the congestive form of dropsy, and may itself induce it under certain conditions. Active congestion does not give rise to any great amount of dropsy, as a rule, but it often causes local œdema.

2. A feeble and relaxed state of the vessels and tissues, in conseqence of which the former readily yield and allow transudation of fluid, often aids in the production of dropsy. The œdema of the feet and ankles which is met with in many cases of general debility is partly due to this cause, being assisted by the weakened cardiac action, which induces mechanical congestion.

3. An unhealthy condition of the blood may occasion dropsy, especially if this fluid is very watery, deficient in albumen, or impregnated with certain morbid materials, such as urea. Under these circumstances its liquid portion more readily transudes through the walls of the vessels. This

cause often aids materially in the production of all forms of dropsy, but it is most important in connection with the anæmic and renal varieties.

4. It has been asserted that dropsy depends chiefly on a withdrawal of nervous influence from the vessels, and experiments have been made to prove that so long as the nerves remain intact, dropsy will not occur, even though the veins are overdistended. That the nervous system does exercise considerable control over the processes of exhalation and absorption is beyond doubt and it must therefore influence the occurrence of dropsy, but there is not sufficient reason to believe that it occupies the important relation to this symptom attributed to it by some pathologists. Œdema is not uncommonly observed in paralyzed limbs.

5. It is highly probable that a deficient power of absorption on the part of the lymphatic vessels assists in giving rise to dropsy in some instances. Possibly this may exercise an influence in many cases of cardiac dropsy, the chief lymph-ducts being unable to empty themselves into the distended veins.

Such being the immediate pathological conditions which explain the occurrence of dropsy, and which are often more or less combined, its more obvious causes may be summed up as follows:

1. Any cardiac disease that interferes with the circulation of the blood, and leads to overflowing of the veins and capillaries. The most important are affections of certain of the orifices and valves of the heart; dilatation of its cavities; and degenerations of its walls, with consequent weak action. The heart may also be displaced or pressed upon by morbid conditions external to it.

2. Affections of the lungs impeding the circulation. When acute bronchitis complicates extensive emphysema, considerable dropsy may follow. Pulmonary affections also not uncommonly aggravate cardiac dropsy.

3. Diseases of the kidney attended with deficient elimination of water and urea, but allowing the escape of albumen in the urine. As a consequence the blood is impoverished and impure, and the vessels are overdistended. Scarlatina demands special mention in this connection as a cause of dropsy, as this symptom then generally depends upon acute renal inflammation.

4. Diseases of the liver or any other morbid condition causing obstruction to the portal circulation. This is a local variety of dropsy, resulting from mechanical congestion.

5. Exposure to cold and wet, or anything occasioning a chill. This cause is generally supposed to act by driving the blood inwards, and inducing active congestion, the resulting dropsy being named active or febrile. It chiefly acts, however, by checking elimination by the skin, and at the same time giving rise to congestion of the kidneys, these organs being consequently unable to perform their functions properly; hence the vessels become overloaded, and the fluid portion of the blood transudes.

6. Any local obstacle in connection with a particular vein. Local dropsy is not uncommonly due to this cause, resulting from the pressure of a pregnant uterus, ovarian and other tumors, or aneurisms; as well as from inflammation of veins, varicose veins, and thrombosis.

7. Gravitation of the blood into dependent parts. Prolonged standing may of itself lead to dropsy, especially if the blood is watery, and the tissues are wanting in tone.

8. Causes which impoverish the blood. Dropsy may be induced by a want of proper diet, especially if combined with other unfavorable hygienic conditions; hæmorrhage or excessive discharges, either natural or morbid; and various acute or chronic diseases, such as fevers, especially malarial, phthisis, cancer, splenic disease, scurvy, purpura, and other lowering affections.

9. Certain conditions leading to active congestion. Dropsy occasionally follows the rapid disappearance of chronic skin diseases, or the sudden suppression of habitual discharges, and is then believed to result from active congestion. This may also be due to the irritation of some morbid deposit, such as tubercle or cancer; and it accounts for the œdema often observed in the neighborhood of inflamed parts.

Anatomical Characters.—The seat and extent of dropsy vary considerably in different cases, as already pointed out; and the same remark applies to the quantity of fluid accumulated. Dropsical fluid presents the following characters: It is almost always thin and watery; either quite colorless or light-yellow as a rule, but sometimes tinged by the coloring matter of the blood or of bile; clear and transparent, or rarely opalescent; usually varying in its specific gravity from 1008 to 1012 or 1014. Its reaction is generally alkaline, but occasionally neutral or slightly acid. Chemically it is allied to the serum of the blood, consisting of water holding in solution albumen, alkaline, and earthly salts, especially chlorides and extractive matters, but the proportion of these ingredients varies much in different parts and in different cases, especially the amount of albumen, and the composition is never identical with that of blood serum, the proportion of solids being much less. Fat, especially cholesterin, fibrin, or pigments are sometimes present, and urea may be found in one special form, viz., in renal dropsy. •

Symptoms and Course.—As a rule dropsy comes on more or less gradually, but sometimes its progress is extremely rapid, and it may extend over the whole body in a few hours. It usually appears first and is most abundant in dependent parts, especially such as are distant from the heart; in those which are exposed; or in regions where there is much loose cellular tissue. It is liable to vary with position, being necessarily influenced by gravitation.

The objective signs of anasarca or œdema are swelling of the affected part, and superficial pitting on pressure, the skin being generally pale, but sometimes congested. The degree of enlargement varies much; it may be so great as to cause the skin to assume a tense, shining aspect, or even to burst or slough. The vitality of dropsical tissues is impaired, and hence they are very liable to erysipelatous and other forms of low inflammation, either spontaneously or from slight irritation. When fluid accumulates within serous cavities, it may or may not produce evident enlargement, but its presence can be made out in most cases by certain "physical signs," to be hereafter described. The subjective symptoms accompanying dropsy of external parts are more or less discomfort or uneasiness, and a feeling of tightness or stiffness, but no actual pain or tenderness is experienced. An accumulation of dropsical fluid interferes mechanically with organs, and may thus cause most serious disturbance of their functions. In certain parts it may lead to a rapidly fatal issue, as for instance, when there is œdema in the neighborhood of the glottis.

The general symptoms will necessarily vary according to the cause of the dropsy. If it is at all considerable in amount, the normal secretions are as a rule deficient in quantity.

Diagnosis.—It is usually not difficult to determine whether dropsy is present, but the chief point in diagnosis is to make out its cause. In order to ascertain this, of course it is necessary to inquire into the history of the patient; to observe what other symptoms are present, both local and general; and to examine carefully those organs, diseases of which are known to occasion dropsy. Much help may, however, be derived from a consideration of certain facts with regard to this particular symptom, viz.:

1. Its place of Origin, Seat, and Extent.—Cardiac or pulmonary dropsy begins in both feet and ankles and extends upwards, ultimately becoming

more or less general. Ascites only follows after the circulation through the liver has been for some time obstructed. Renal dropsy frequently starts in the face and upper part of the body, especially about the eyelids, where there is much loose cellular tissue, and in the hands, because they are exposed. It may rapidly spread all over the body, and involve all the serous cavities, though not usually to a great extent. Hepatic dropsy is confined to the peritoneal cavity at first, because the portal system is alone interfered with. The abdomen may become considerably distended before any dropsy is observed elsewhere, but in most cases after a while anasarca of the legs sets in, in consequence of the pressure exercised by the fluid upon the vena cava inferior. Anasarca of the legs and ascites may appear simultaneously, should there be any pressure upon the inferior cava just before it passes through the diaphragm. Anæmia never causes much dropsy; it is always limited to the subcutaneous tissues; and is usually only seen about the feet and ankles, or in the loose tissue of the eyelids. Local dropsy, as, for instance, œdema of one leg or arm, always indicates some local obstructive cause. Rarely the superior cava is pressed upon, and dropsy of the upper part of the body is one of the consequences.

2. Its Rate and Mode of Progress.—Cardiac dropsy is generally slow and gradual in its progress, liable for a time to some variation according to position, but ultimately this does not influence it much. It may increase rather quickly in consequence of some acute pulmonary complication. Renal dropsy, if acute, may be extremely rapid in its course, in some cases producing enormous enlargement of the whole body and obliterating the features in a few hours. This is the only form of dropsy in which such a mode of progress is observed; may also disappear in the same rapid manner. Hepatic dropsy usually progresses slowly and steadily. That of anæmia comes and goes easily, being often present about the feet in the evenings, but disappearing with a night's rest, while the eyelids are puffy in the mornings.

3. The Effect of Pressure is said to distinguish between cardiac and renal dropsy, but this is a very unreliable sign. The latter is stated to pit much less, and to retain the impression of the finger longer, elasticity not being quite lost.

4. The Appearance of a dropsical part may assist the diagnosis. Thus in some cases of renal disease the skin presents a very peculiar dull-white, pasty aspect. In cardiac dropsy signs of venous congestion are often present, the skin being shining and tense.

5. Characters of the Fluid.—That of renal dropsy is of a very low specific gravity, containing only a small quantity of albumen, and urea can in some instances be detected in it.

6. The Effects of Treatment.—The dropsy of anæmia is easily got rid of; the renal form can frequently be removed for a time or permanently by appropriate treatment it is difficult to bring about absorption of cardiac dropsy as a rule, if it is at all considerable in amount, and it is liable to return speedily.

Prognosis.—The chief questions with which the prognosis of dropsy is concerned are its immediate danger to life; the probability of curing it permanently; and its temporary removal or alleviation. Caution should be exercised in giving an opinion, especially an unfavorable one, for cases which seem quite hopeless sometimes improve in a remarkable manner. The main data upon which the prognosis is founded, are: 1. The cause of the dropsy, and the possibility of removing such cause, special attention being directed to those organs which are so frequently accountable for this symptom. 2. Its seat, dropsy of some structures, *e. g.*, œdema of the larynx or lungs, being immediately dangerous to life; while in other parts it is very difficult to get rid of. 3. Its extent over the body, and the quantity of fluid accumulated. 4. Its duration and progress, acute and rapidly-spreading dropsy being highly dangerous, but at the same time often more easily dispelled than that which is chronic and steadily progressive. 5. The possibility of adopting appropriate treatment, and the effects resulting therefrom. This applies particularly to those active measures which have for their object the absorption of the fluid, much depending upon the strength of the patient and his ability to undergo the requisite treatment, as well as upon the state of those organs which are directly acted upon. 6. The condition of dropsical parts, there being more danger if their nutrition is obviously impaired, or if they are the seat of any form of low inflammation.

Treatment.—The objects to be kept in view in the treatment of dropsy are: 1. Its removal. 2. The prevention of its recurrence. 3. The prevention as far as possible of its injurious effects, if the fluid cannot be removed. The particulars of treatment must necessarily be governed by the cause of the dropsy, and the condition of the several organs, but there are certain general principles which need attention, of which an outline will now be given, as well as of the means by which they are to be carried out.

1. Removal of the Cause.—As illustrations may be mentioned the relief of any pressure or constriction affecting a vein; or of an attack of acute bronchitis in cases of cardiac disease, which may seriously aggravate dropsy to this cause. Of course it is highly important to attend specially to any organ, a morbid condition of which is keeping up dropsy, and to try to cure the disease, or at all events to render the organ capable of performing its functions, so far as this is possible.

2. Attention to Rest, Position, and Regulated Pressure.—Far too little heed is usually paid to the influence of rest and position in the treatment of dropsy. The part affected should, if necessary, be maintained continuously and for a long time in an elevated position. Much benefit may often be obtained by keeping the legs, if they are the seat of anasarca, on a level higher than the body; or by raising an œdematous scrotum by means of a pillow of cotton-wool placed underneath. Pressure is also very valuable in many cases if carefully and properly applied.

3. Promotion of Absorption of the Fluid.—This indication is carried out by employing diaphoretics, saline and watery purgatives or diuretics, so as to promote free secretion by the skin, intestines, or kidneys respectively, and thus to remove some of the watery portion of the blood.

The only diaphoretic that is of much practical value in the treatment of dropsy is some form of bath which promotes perspiration, such as the warm, vapor, hot air, or Turkish bath. Either of these may be used as frequently as circumstances require; and local baths may be employed with much advantage if the patient cannot sustain general baths. It is in the treatment of renal dropsy that they are most valuable, and especially of acute cases. An occasional bath is also useful in preventing this form of dropsy. Diaphoretic medicines are often given, such as ipecacuanha, antimony, spirits of nitre, liquor ammoniæ acetatis, or citrate of potash, but they afford little or no assistance from their diaphoretic action in the removal of dropsy. Jaborandi might prove serviceable in some cases.

Watery purgatives are frequently highly efficient in relieving dropsy, but care must be exercised in their administration, as they tend to weaken a patient. The most important are extract of elaterium (gr. $\frac{1}{8}$ gradually increased to gr. $\frac{1}{2}$); jalap (℈j to ʒj); and cream of tartar (ʒj to ʒij); the last two form a very effective combination. They may be given two or three times a week, or oftener if required. Other purgatives are employed, such as gamboge, veratrum, podophyllin, calomel, or croton oil, but these *are much less admissible* ordinarily, though they are occasionally serviceable. There can be no doubt that the effect of pills administered by certain quacks, which is sometimes really marvellous, is due to powerful drastic purgatives which they contain.

Diuretics are most beneficial in some forms of dropsy. Those usually given are the nitrate, acetate, or citrate of potash or soda in full doses, freely diluted; cream of tartar in small doses; spirits of nitre; infusion or tincture of digitalis, or the powdered leaf made up into pills with other ingredients; squill in the form of tincture or pills; spirits or infusion of juniper; infusion of fresh broom tops; or oil of turpentine. The balsam and resin of copaiba have been found efficacious in the treatment of some cases of ascites. The following pill will sometimes produce a good effect in relieving dropsy, given about every other night: ℞. Ext. elaterii, gr. ⅙ to gr. ½; pulv. scillæ, gr. ½ to gr. j; pulv. digitalis, gr. ½ to gr. j; ext. hyoscyami, gr. 1½. M. fiat pil. Digitalis is also used as an external application, poultices of the leaves being placed over the abdomen, or the powder rubbed in, or fomentations of its infusion being employed. Gin or whiskey freely diluted undoubtedly acts as an efficient diuretic in the treatment of some cases of dropsy.

Bloodletting has been recommended under certain circumstances, with the view of unloading the vessels and thus assisting the action of other remedies, but such treatment can rarely, if ever, be indicated.

4. Removal of the Fluid by Operation.—If dropsy cannot be got rid of in any other way, it is necessary to have recourse to certain operations, and I believe that these are often delayed until too late a period, and ought in appropriate cases to be performed, not as last resources, but as curative measures. These operations include: 1. Paracentesis or tapping of serous cavities, especially to be adopted in certain cases of ascites. 2. Acupuncture or scarification of the skin, or the introduction of small canulæ into the subcutaneous cellular tissue, in cases of anasarca. It is generally quite sufficient to make several superficial punctures with an angular needle in dependent parts, repeating them as often as may be required, and taking care that the punctured spots are not inflamed by urine or other sources of irritation. Dr. Southey has, however, introduced a really useful and efficient mode of treatment which is applicable to many cases of anasarca, namely, the introduction through the skin of small canulæ by means of a trocar, these being left in after the withdrawal of the trocar, so that the dropsical fluid may drain away through them, a drainage-tube being attached to each canula. By this method a considerable quantity of fluid is often rapidly removed.

5. Improvement of the Condition of the General System and Blood.—Treatment directed to the object is generally of much service, and it may be the chief thing called for, as in cases of dropsy due to anæmia. The digestive and nutritive functions must be attended to, as well as the diet, which should be of a nutritious character, without much liquid. All hygienic conditions must be properly regulated. Tonics are often indicated, and above all some preparation of iron, especially the tincture of the perchloride, which has a marked influence upon the composition of the blood.

6. Prevention of Irritation of Dropsical Parts.—It is important to keep all external dropsical parts clean and dry; to prevent them from being unduly pressed upon; and to ward off all other sources of irritation.—FREDERICK T. ROBERTS.

DROWNING—*See Asphyxia.*

DUCHENNE'S DISEASE—*See Muscles, Diseases of.*

DUNGA BOUQUET—*See Dengue.*

DUODENITIS—*See Enteritis.*

DURA MATER, Fungus of.—A tumor springing from the dura mater, and pressing outwards through the cranium; simple and malignant forms; the thinned skull may be felt crackling over the tumor after it has pressed its way through, and the tumor pulsates with the respiratory movements like the brain. Before tumor appears externally, there are usually signs of intracranial pressure, *e. g.*, diplopia or even convulsions.

Prognosis.—Eventually fatal, without treatment; very unpromising with.

Treatment.—Moderate compression gave relief in some cases. In suitable cases expose tumor by a crucial incision; enlarge opening in skull if necessary with trephine, and remove tumor from dura mater, if possible. It is next to impossible to diagnose before operating, whether similar tumors spring from the dura mater or from the cranium itself. Refer to Louis on Fungous Tumors of Dura Mater, Sydenham Society's Translation.

Dura Mater, Irritation of.—Injuries of the head which cause this produce symptoms such as contractures and convulsions on the same side of the body.—See Duret on "Cerebral Traumatism," and an abstract by Ferrier, in *Brain*, for 1879. A very severe case of this affection recovered under cold douche.—*See. Trans. Clin. Soc.*, 1879, p. 145.—C. B. Keetley.

DYSÆSTHESIA—*See Hyperæsthesia.*

DYSENTERY.—*Natural History.*—An infectious febrile disease, accompanied by tormina, followed by straining, and scanty mucous or bloody stools, which contain little or no fæcal matter. The minute lenticular and tubular glands of the mucous membrane of the large intestines, with the intertubular connective tissue, are the chief seats of the local lesion, which sometimes extends into the small intestine beyond the ileocælic valve; especially in cases in which scorbutus is a predisposing cause. Dysentery is a most formidable disease, on account of its oftentimes insidious nature, from its tendency to recur, and from the after influences it exerts on particular organs and on the system at large. It is the cause and origin of many of those chronic and intractable abdominal ailments which so often afflict Europeans resident in tropical climates, and entails most varied forms of impaired health when they return to European countries. The disease is rare in this country. It has been usual to describe cases of dysentery as either acute or chronic; but there are also cases belonging to a third class, which may be termed complex. In acute cases the inflammation does not confine itself to the tissues of the mucous membrane only. The serous covering of the intestines, or even such solid viscera as the liver, spleen, and kidneys, are involved in a disease-process. Ulceration or sloughing of large portions of mucous membrane and exudation go on together, and there may be very little corresponding fever at all commensurate with the severity of the lesions, so that while the disease is acute, it is at the same time, in many instances, of a masked and almost latent nature. Death may take place within the first ten or twelve days; but the disease may terminate in recovery gradually and spontaneously, or as the result of appropriate treatment, by the end of the third or fourth week. On the other hand, the disease may not end so favorably and early, but may advance unchecked; the morbid changes being slow in progress, often extending over several months, and then the case passes into chronic dysentery, one of the most hopeless and intractable forms of disease which the physician has to treat. The wasting of the tissues of the patient progresses steadily, till a human form, literally reduced to the state of a living skeleton, whose bones are held together by skin and ligament, is all that remains. The skin acquires a dry, bran-like, furfuraceous aspect, and the epithelium desquamates in scales and powdery particles. Various intercurrent morbid states become developed, not necessarily connected with the primary affection, but forming secondary lesions to the disease, and constituting the third form in which dysentery must be studied, namely—as complex cases of dysentery in which there are various secondary lesions, which are regarded by some as directly connected with the primary affection. There are also secondary lesions connected with antecedent forms of disease, which sustain a renewed impulse to their development by the dysenteric state. These secondary lesions consist of—(1.) Lesions of the small intestines, and of various solid viscera; (2.) lesions which may be referred to the co-existence of certain morbid states of the patient with the dysenteric condition, such, for instance, as the typhus, scorbutic, and the scrofulous state. In some cases a considerable portion of the colon and rectum only is affected; in other instances not only is the whole of the great gut the seat of some form of the exudative process, but the lower portion of the small intestine also. The most commonly affected portions, however, are the rectum, the sigmoid flexure, and the descending colon. When the caput cæcum is involved, the vermiform appendix participates in the process. Creamy-like exudations have been seen to fill its tubular glands, which in some cases proceed to ulceration and perforation. Exuviæ, or casts of the intestine, may be thrown off in large masses or shreds, leaving a raw-looking vascular surface underneath. In some respects this process and these casts are analogous to similar phenomena in croup, diphtheria, dysmenorrhœa, and typhoid fever; and by carefully examining the evacuations in cases of dysentery, important information may be obtained as to the nature of the process going on in the intestines. The evacuations should be washed with water in all cases, so as to get rid of the fæcal matters entirely, leaving the sediment, which is the product of the colonic disease, free from bile, fæcal matter, and offensive smell. This sediment consists of ropy, gelatinous, branny, or thready mucus; lymph in shreds or granular masses; pus, fæces, and sloughs. The exuviæ are thin, membranous, and sometimes infiltrated with pus; or they are thick and of a yellowish-brown color. It is not till after the eighth or twelfth day of the disease that such sloughs are cast off; after which the symptoms diminish, and the patient may get well rapidly. During the shedding of the shreds the patients are much griped, and they pass with straining the sanguinolent masses or slimy mucus in small quantities fifteen or even twenty times a day.

Of morbid states of the solid viscera associated with dysentery, by far the most frequent complication is that with the kidney and the liver. The association of hepatic disease with dysentery is most frequent in the climate of the East Indies and West Coast of Africa, and in such climates as have a similar influence. Regarding hepatic complication, the following conclusions may be stated: (1.) That dysentery, in a great number of cases, more than a half, commences and runs its course complicated by obvious functional hepatic disease. (2.) That the hepatic disorder and the dysentery acknowledge a common cause and disease-process. (3.) That about 18 per cent. of the fatal cases of dysentery are complicated with hepatic abscess; and about 57 per cent. with hepatic lesions. (4.) That in a few of these cases ulceration of the intestine may be the primary disease and the source of the hepatic abscess, by the phenomena of thrombosis and embolism in connection with the pelvic veins and veins of the mesocolon. Too narrow a view must not be taken of the relation of liver disease to dysentery; for, if we are to judge by the condition of the bile alone, the liver is diseased (in function, at least) in every case of dysentery. On the whole, it will be seen that the association of dysentery with hepatic abscess is not equally frequent in all countries, nor in all epidemics. Dysentery "is found to complicate readily in all climates with the prevailing fevers." Within the tropics it is frequently associated with remittent and intermittent fevers; in the geographical region of typhus fever it is a most frequent complication, under various circumstances, and becomes capable of propagation from person to person; and lastly, it is also occasionally complicated with scurvy—when the supply of food has been deficient in fresh vegetables, or when it consists in whole or in the greater part of salted meat. Types and forms of dysentery have been variously described as—(1.) The purely inflammatory, acute, hyper-acute, or sthenic form; (2.) the asthenic forms. An ordinary attack of acute dysentery generally commences with diarrhœa; but in twelve or twenty-four hours disagreeable feelings begin to attend the frequent loose discharges from the bowels, such as irregular pains, commonly call "gripes," along the course of the large intestine, and described as "shooting," or "cutting" (tormina)—momentarily relieved by discharges from the bowels. After a short time a sense of heat ascends from the rectum, and pain extends to the epigastrium till the whole abdomen is painful. With frequently returning inclination to go to stool, the griping and straining continue without the patient being able to pass anything more than a little bloody mucus. These symptoms are aggravated during the night and early morning, and leave behind them the exhausting sensation that there always remains in the bowel something which has yet to be discharged. This feeling is technically called tenesmus, and ultimately becomes the most striking feature in the case. The acute pain in the abdomen generally concentrates itself at last about the rectum. The discharges from the bowels are at first scanty, consisting of mucus and blood, or bloody slime. The evacuations soon become more copious, tinged with bile, and carry off shreds of the exudation thrown out on the mucous surface of the intestine. Hardened balls of fæces, called scybalæ, are also sometimes discharged; and if much feculent matter pass, there is always considerable relief. When the disease is fully established, the discharges exhale an odor which is almost peculiar to dysentery, very offensive, and different from the smell of fæces. It is important to observe the character of the discharges, and especially as to the relative amount of blood, mucus, and shreds of exuviæ. In acute dysentery the patient may be carried off by copious discharges of blood. When the skin is dry, and of a pungent heat, the tongue furred, and the thirst urgent, the urine scanty and high-colored, and the pulse increasing in frequency—these are symptoms of increasing danger in dysentery. Throughout the disease there is febrile distress, the nights are passed without sleep, or when it is obtained it is in short periods, dreamy, and disturbed; and when the patient awakes he is unrefreshed, and his spirits low and desponding. Convalescence is always slow, rarely complete; and there is perhaps no disease which makes so persistent and pernicious an impression on the human constitution as dysentery.

Treatment.—The prevention of the disease is all important. The conditions of the diet, that it be sufficient as to its animal and vegetable elements, and of good quality, must be investigated. To insure the means of detecting the disease early is necessary—for time is of the greatest importance in its cure, especially by removing the patient from the sphere of action of any of its predisposing or exciting causes, especially malaria; and also to see that his surroundings are free of all those circumstances which co-operate in aggravating the disease, the chief of which are over-crowding, bad ventilation, bad food, exposure to cold and wet, and intemperance. Ipecacuanha (*radix ante dysenterica*) was formerly, and still is, much in vogue as a remedy in dysentery; but, although highly useful in some conditions, it is not to be regarded as a specific in all forms of the disease. It is more effectual in the acute than in the chronic forms. It is given either in large or in small doses. The large dose method is to give as early in the disease as possible grs. xxv. to grs. xxx. of ipecacuanha, in as small a quantity of fluid as possible, or in the form of a bolus. A preliminary dose of opium is often of service in enabling the stomach to retain tha ipecacuanha. The patient should remain perfectly still in bed, and abstain from fluid for at least three hours. Thirst may be appeased by sucking small bits of ice, or taking not more than a teaspoonful of iced water. In from eight to ten hours, from 10 to 15 grains may be again administered, with the same precautions as before. The tormina and tenesmus subsiding, the motions becoming feculent, blood and slime disappearing, after profuse perspiration the patient falls into a tranquil sleep, and awakes refreshed. Ipecacuanha may require to be continued in diminished doses for several days, with sufficient intervals between each dose to admit of food being taken; and for several nights after the stools appear normal, grs. x. to xii. should still be given at bed-time. Astringents in any shape during the acute stage are not only useless but dangerous. Blood-letting has no beneficial influence over inflammation of the mucous membrane within the abdominal cavity. Opium is more valuable in the chronic than in the acute form of dysentery. It may be given in large doses combined with acetete of lead (gr. iii. to gr. iv.) in each dose, nitrate of silver or sulphate of copper; and in enemata it tends to relieve tormina and tenesmus. When the pains are excruciating and attended with tenesmus, the warm bath generally gives instantaneous relief, if adopted sufficiently early. It must be brought to the bedside, and kept at a high temperature, not under 99° or 100° Fahr., and the patient is to remain in it till he feels faint. He is then to be carefully and quickly dried, put to bed, and have gr. xv. to xx. of ipecacuanha. Leeches to the number of six to twelve applied round the verge of the anus often afford sensible relief to the tormina and tenesmus, by unloading the portal and hæmorrhoidal veins. In subacute and chronic dysentery no remedy has proved more useful than nitrate of silver, in doses of half a grain to one and a half grains daily, reduced to fine powder, and conjoined with Dover's powder in the form of a pill. It has also been extensively used in the form of enema; also, a combination of sulphate of copper and of opium is often highly serviceable. Solution of the pernitrate of iron, Dover's powder (Pulv. ipecacuanha composita), nux vomica, combined with opium, and iron, are remedies that are available and useful. "In no disease is early treatment more necessary than in dysentery; and if conducted judiciously, we may look for good results in a large proportion of cases, except in the malignant and 'putrid' forms. In the scorbutic form the Bael fruit when procurable, is a valuable remedy."—WILLIAM AITKEN.

DYSENTERY, Infant—*See Diarrhœa and Dysentery, Infant.*

DYSIDROSIS.—This affection is due to an inflammation of the sweat structures of the hands and feet, which was first described by Dr. Tilbury Fox in 1873, and is figured by him in his edition of Willan and Bateman's Atlas. The patient comes, as the rule, in severe cases, for advice with the hands held up to prevent their distension with blood, and wrapped up on account of their swollen, painful condition. This fact is an indication that the disease is clearly inflammatory and painful. Dysidrosis is characterized clinically at the outset by a certain amount of tumefaction and redness of the part affected, and the rapid development or distension of the sweat ducts, which look like small sago grains imbedded, and at first not rising above the level of the skin. The sites affected, and generally symmetrically, are the sides and palmar aspect of the fingers, the palms, and often similarly the feet. There may exist also at the same time miliaria of the general surface. Unless the attack is excessively mild the parts soon become decidedly reddened, tender, and swollen, and they itch and burn. As the collected fluid, which is at first acid as it issues from the patent orifices but rapidly becomes mixed with serum and alkaline, increases in amount, the vesicles get larger and project above the surface, and then become confluent, finally forming large bullæ-like collections of fluid. The cuticle macerates and peels off, exposing a reddened hyperæmic surface, which, however, does not discharge like an eczema. The disease tends to run a definite course of 10–20 days, but the hand may remain considerably inflamed for some time. There is, however, a great tendency to the recurrence of the affection. It may occur in winter, but more frequently in summer, and it especially attacks weakly persons who are the subjects of nerve debility. It is rarely that the patient is found otherwise than with a pallid look, and complaining of weakness and debility.

Diagnosis.—The diseases which dysidrosis may be confounded with are eczema and pemphigus. It must be a very rare occurrence for eczema to be limited symmetrically to the hands (and feet), and especially to their palmar aspects. Moreover, dysidrosis, lacks the prominent catarrhal features of eczema and the characteristic sero-purulent discharge. Phemphigus, with little or big bullæ, sometimes occurs limited, at any rate for a time, to the hands, but rarely, if ever, to the palms. The history of the evolution of the bullæ is quite different, the imbedded aspects of the vesicles in their early stage, which are seated at the sweat ducts, and the loculated appearance of the dysidrosis bulla are peculiar. It may be well to remind the reader that Mr. Hutchinson described in 1876 a neurotic, symmetrical, bullous disease of the hands and feet, commencing like dysidrosis, which Dr. Tilbury Fox recognized as an exaggerated example of the latter affection, but Mr. Hutchinson, Dr. Liveing, Dr. Robinson, of New York, and others, do not regard it as a disease of the sweat apparatus.

Anatomy.—Dr. Liveing regards dysidrosis as a "local hyperidrosis, consisting in an excessive secretion of perspiration, which, in consequence of its profusion and the congestion of the skin, which necessarily attends such an excessive secretion, does not entirely escape through the sweat ducts, but leads to a general maceration of the cuticle and to secondary eczema." He adds, truly enough, that the sago-grain appearance of the vesicles might be presented by any little collection of fluid under such skin as exists on the palms and soles. Dr. Robinson examined microscopically a case which he considered dysidrosis, and he could find no connection of the disease with the sweat ducts. Drs. Tilbury Fox and Crocker, however, in the last volume of the Clinical Society's Transactions have published an elaborate microscopic report upon portions of skin removed from a typical case in the earliest stage, and in which they thoroughly established the connection of the disease with the sweat glands, which had been concluded from clinical facts. They found all of the tissues very hyperæmic, the sweat glands and ducts especially so, and exhibiting signs of inflammatory irritation. In the rete were found the vesicles filled with inflammatory products. They were in direct communication with the sweat ducts, and situated in the interpapillary portion. Dr. Liveing had stated his view before he had had an opportunity of seeing these specimens, which were exhibited to the Pathological Society only recently.

Treatment.—At first diuretics should be given, especially in gouty subjects or those in whom the urine is loaded or scanty, and these remedies should be followed up by suitable tonics, especially quinine and iron. A cool regimen should be adopted, hot drinks avoided, or whatever will increase the perspiration. Locally, if the body generally be affected with miliaria, alkaline baths may be prescribed, but the chief thing to do is to soothe the inflamed parts at the outset by wrapping them in some bland or oily substance such as Carron oil, and to subsequently use a slight astringent, In some cases patients affected by dysidrosis are very weak, and in such the disease may lapse into a semi-chronic state, and then a long course of tonic treatment, consisting of quinine, mineral acids, and nux vomica, must be adopted.—*Epitome of Skin Dis.—T. Fox and T. C. Fox.*

DYSMENORRHŒA.—*Definition.*—Painful menstruation: (1) neuralgic, (2) congestive, (3) obstructive, (4) membranous, (5) ovarian.

Causes.—1. Tendency to general neuralgia, chlorosis, gout, rheumatism, luxury, masturbation, excessive coitus.

2. Plethora, chill, sluggishness of liver, retroflexion, areolar hyperplasia, endometritis, pelvic cellulitis, pelvic peritonitis.

3. Constriction of the inner os, anteflexion, fibrous tumor, polypus, constriction of vagina (?).

4. Endometritis, with exfoliation of entire lining membrane; hypernidation.

5. Congestion of ovaries, ovaritis.

Symptoms.—1. Pain, sharp, fixed, over pelvis and loins or in distant parts, either before or during the flow.

2. Severe pain in pelvis, with constitutional disturbance if caused by a chill. If from inflammation, pain dull and heavy.

3. Severe extruding bearing-down pain before the flow, eased by the flow being established.

4. Steady increasing pains, ceasing on the expulsion of the membrane.

5. Pain for several days before the period in one or both inguinal regions, extending down the thighs; usually accompanied by pain in one or both mammæ; "intermenstrual" pain.

Signs.—1. Nothing beyond the symptoms.

2. Cervix tender and swollen; retroflexion detected by the touch, confirmed by the uterine sound during the menstrual interval.

3. Constriction and anteflexion detected by the sound; the presence of tumors, etc., by the touch.

4. The extruded membrane, which is really a true decidua unassociated with pregnancy, an unbroken denidation.

5. Region of ovaries tender as a rule, not invariably.

Diagnosis.—1. Pain not expulsive, flow uninterrupted, absence of clots; examination reveals absence of obstruction; absence of constitutional disturbance; no intermenstrual leucorrhœa nor pain.

2. Constitutional disturbance; other signs of inflammation; intermenstrual pain increased on locomotion; leucorrhœa.

3. By marked bearing-down pains and detection of the obstruction on examination.

4. By the membrane.

5. In many cases by the detection of the swollen tender ovaries; by the characteristic pain.

Prognosis.—1. If hygienic conditions can be had recourse to, favorable.

2. If the cause can be remedied, the symptoms will disappear. In fibrous tumors, pelvic inflammation, or severe displacement, unfavorable.

3. If the obstruction is amenable to treatment, favorable.

4. For entire cure, unfavorable or very tedious.

5. Unfavorable.

Treatment.—1. General neuralgia by nerve tonics, Indian hemp, bromide of ammonium, exercise, change of air; of chlorosis; gout and rheumatism, by warm clothing, Roman bath, colchicum, guaiacum, etc.; avoidance of other causes.

2. According to cause (*vide in loco*).

3. By dilatation, incision, intrauterine stem, tents.

4. Dilatation of the cervix and the application to the whole lining of the uterus of carbolic acid, nitric acid, or solid nitrate of silver.

5. Leeches to the cervix just before the period, iodine or blisters to the inguinal regions, anodyne pessaries, pregnancy.—HEYWOOD SMITH.

DYSPAREUNIA.—*Definition.*—Painful coitus.

Causes.—Areolar hyperplasia, imperfect rupture of the hymen, or hyperæsthesia of the carunculæ myrtiformes, constriction of the vagina, disparity between the organs in the sexes, cervicitis, vaginal tumors, vaginitis, vaginismus, ovaritis.

Symptoms.—Severe pain preventing the act, or rendering it agonizing.

Signs.—According to the various causes enumerated above.

Diagnosis.—The examining finger will usually detect the cause.

Prognosis.—Favorable in proportion as the cause is remediable.

Treatment.—Of areolar hyperplasia; of imperfect rupture of the hymen, the ragged remains to be carefully and completely dissected off, and Sims' vaginal dilator used frequently; of constriction of the vagina by the vaginal dilator; of cervicitis; of vaginal tumors according to the case (*vide in loco*); of vaginitis; of vaginismus; of ovaritis.—HEYWOOD SMITH.

DYSPEPSIA.—*Natural History.*—This condition is regarded as an abnormal functional difficulty rather than a disease, due—First, to sympathetic relations with other organs, themselves in a morbid state, and explained by the phenomena of "reflex action,"—*e. g.*, nausea, and sometimes vomiting, which attends irritation of the lung, brain, liver, or uterus. Second, to a scanty secretion of the gastric juice. This difficulty of digestion is characterized by slowness and long retention of food by the stomach; prolonged distress after eating, especially weight and uneasiness at the pit of the stomach; tendency to decomposition of food in the alimentary canal; the evolution of fetid gases; and the appearance of unaltered ingesta in the stools. Gastric digestion should occupy, on an average, from two to three hours. Dyspepsia is often an inheritance by birth, and the conditions which tend to impair digestion are, especially, mental over-exertion, prolonged anxiety, especially after meals, gluttony, drunkenness, sedendary habits the consumption of more food than the system requires, and alcoholic stimulants. Third, to the abnormal quality of the gastric juice, or diminished movements of the stomach, so that the ingesta are not sufficiently mixed with the gastric juice. Cardialgia is the name of the characteristic symptoms of this condition—namely, pain at the orifice of the stomach. It is also sometimes termed heartburn, or pyrosis, or water-brash. Tobacco also has a poisonous principle which greatly favors dyspepsia, and many persons suffer severely after smoking a few cigars or even one. Dyspepsia of liquids also causes great uneasiness; and on vibration of the stomach the fluid may be heard splashing about in it—the stomach being generally distended to an abnormal extent.

Treatment.—When congestion exists, a sparing and easily digested diet and total abstinence from fermented drinks are imperatively demanded. When catarrhal inflammation prevails, the blandest food must be given in very small quantities; and in severe cases leeches are to be applied over the region of the stomach, and iced water, or small pieces of ice, taken occasionally to relieve the thirst. The necessity is absolute of a regulated diet in all cases of impaired digestion. If fulness and uneasy sensations are experienced after dinner, less food should be taken at that meal, and more at breakfast; the principle being to apportion the amount of food more evenly over the waking hours than is commonly done. In cases of slow digestion, with deficient secretion of the gastric juice, the rules of treatment are—(1.) To let albuminoid food be as liquid as possible—eggs, therefore, must be eaten when cooked short of coagulation of the albumen; (2.) to let the day's allowance of food be taken in small quantities at regular intervals; (3.) that by the administration of alkalies the food may pass to the intestines, and be digested there, rather than by the stomach.—WILLIAM AITKEN.

DYSPHAGIA is a symptom arising from obstruction to the œsophagus, *e. g.*, by pressure from aneurism, tumors, &c., or from ulcers, cancers, or foreign bodies; sometimes merely spasmodic.—*Vide* Œsophagus.

DYSTROPHIA CUTIS.—*Definition.*—Certain changes in the skin, other than zoster, usually of an atrophic, inflammatory, or gangrenous nature, which arise under the direct influence of lesions of the nervous system.

Symptoms.—The appearance met with may be arranged under the heads:

1. Atrophic or "glossy skin."
2. Œdematous.
3. Eruptive, erythematous, papular, vesicular, or bulloes.
4. Ulcerative or gangrenous, "acute bedsore.

1. "Glossy skin" is the term applied by Paget and Weir Mitchell to a peculiar condition, somewhat resembling scleroderma, which supervenes after irritative lesions of the peripheral nerves. It sometimes follows a clean cut, entirely dividing the nerve; but more commonly a partial division, contusion, laceration, or compression in a cicatrix, callus, etc., is the cause. The skin is smooth, pale, and anæmic, or pinkish and blotched, as if by chilblains, glossy, and its natural wrinkles effaced. The epidermis is often fissured, the nails are cracked and distorted, the hair is shed, and the sweat glands are atrophied, and their secretion diminished. The affected part is usually extremely tender and the seat of neuralgic pain, and its temperature is often lowered.

2. Œdematous.—There is often slight œdema of the skin and subcutaneous parts in paralyzed limbs, which lasts for a considerable time, and gradually disappears as recovery takes place. Peculiar pale or slightly erythematous localized swelling of the skin and subcutaneous tissue, resembling chilblains, are also met with, appearing after neuralgic attacks at the sites of pain. They are sometimes described as urticarial, but are attended by intense shooting or burning pain, and not itching.

3. Eruptive.—The "lightning pains," of locomotor ataxy, and the neuralgic attacks met with in pachymeningitis, caries, or cancer of the vertebræ, and other affections in which there is compression and irritation of the posterior nerve roots, are often accompanied by an eruption on the painful points of skin, erythematous, papular, vesicular, pustular, or bullous in character. The patches correspond in situation, as in zoster, with the distribution of cutaneous nerves, and in their course and duration resemble that disease.

4. Ulcerative and gangrenous patches may occur as the sequelæ of the last-mentioned changes, or as an independent form in the "acute bedsore," to which special attention has been directed by Charcot. This lesion, of grave and usually fatal import in the prognosis of cerebral or spinal disease, appears, according to this authority, a few days, or occasionally only some hours, after the onset of the nerve symptoms, as an erythematous patch of variable extent and irregular shape, seated, in spinal disease, over the sacrum, in cerebral usually on one of the buttocks. The color, at first light red, or somewhat bluish, fades on pressure, and in some spinal cases there is a phlegmonous-looking infiltration, attended sometimes with anæsthesia, at other times with severe pain. After a day or two vesicles or bullæ, containing clear brownish or sanguineous fluid, appear in the centre of the patch; these soon burst, exposing a bright-red base, dotted with purplish-black spots of cutaneous hæmorrhage, which often extends as deep as the subcutaneous tissue or muscles. The purple spots soon become confluent,

necrose, and form a black slough surrounded by a margin of erythema. Patients rarely live long enough for the slough to be cast off, but in more chronic cases septicæmia and gangrenous meningitis soon prove fatal. These patches appear even when the most scrupulous care is taken to avoid pressure or any irritation of the skin from the urine or fæces.

Diagnosis.—The occurrence of these phenomena in connection with severe diseases of the nervous system, their restriction to certain special sites, usually related to the cutaneous distribution of nerves, and the presence, before or throughout their course, of neuralgic pain, will clearly indicate their nature.

Prognosis.—As these skin manifestations are merely symptomatic, their prognosis is that of the diseases in which they occur.

"Acute bedsore" is, according to Charcot, an omen of a fatal result.

Treatment.—This falls beyond the scope of this work. In "acute bedsore" keeping the part clean, the frequent application of some antiseptic lotion or powder to diminish the risk of septicæmia, and poultices to promote the separation of the sloughs should be employed.—MALCOLM MORRIS.

EARACHE, Acute Inflammation of the Tympanic Cavity.—The expression earache conveys the most striking idea of the prominent characteristic of this disease. It is extremely painful. The patient is attacked with considerable suddenness, although if the source of the trouble is the throat, there may be pain in that part preceding the pain in the ear, which rapidly passes up the Eustachian tube to the middle ear. The character of the pain is that of a feeling of fullness in the ear; this is furher aggravated by the heart's impulses, which give a throbbing character to it. This may continue for from one to several hours, when rupture of the membrane and discharge of pus, mucus, serum, or blood, or all combined, give relief to the patient. If no treatment is employed, the pain may recur every day, or more likely at night, for several days or even weeks, as has been observed. This pain is aggravated by a horizontal position of the body, and the patient suffers less sitting upright. The whole side of the head may be painful, and the region about the auricle quite tender. There may or may not be constitutional disturbance. In severe cases there will be fever, elevation of the temperature, sometimes delirium, and in cases of children, convulsions; the symptoms somewhat resembling brain disease. The discharge varies in quantity and quality, with the severity of the attack. If it is mostly purulent and excessive in quantity, the name purulent otitis is given to the disease; if pronouncedly mucous, it partakes more of the nature of catarrhal otitis; if blood is the principal characteristic of the discharge, then it may be called hæmorrhagic otitis. In much milder cases, with less pain and discharge, and the latter principally composed of serum, then it may be called serous otitis media. This discharge usually continues until the membrane is healed, which may be from three to four days to as many weeks, provided the disease becomes cured during the acute stage. If not, then it goes on as a chronic otitis. Tinnitus aurium is always present. The voice of the patient is heard with unpleasant distinctness in his own ears (autophony), and has a very unpleasant hollow sound, the patient having a bewildered stuffy sensation in his head. Previous to the relief of the pain the patient may have prolonged crackling, snapping or hissing sounds, which dart with sharp pains through his ears, but which diminish the throbbing pain at each exhibition, until relief is soon experienced. The hearing at the outset may be preternaturally acute, and loud noises may even be painful. Subsequently it may be so reduced as not to be able to detect the loudest conversation. The tuning-fork may be heard best in the worst ear, unless the tympanum is filled with inflammatory products, or so hyperæmic as to interfere with vibrations, when it is likely to be heard best in the best ear. On inspection, the membrane may not be visible on account of swelling of the canal, which often obliterates it. When plainly visible, before the discharge, it will be partially or wholly reddened. In the latter instance it may look like raw beef; in the former, the injection may be along the malleus handle, including the region of the short process, or the periphery may also be injected. If the tympanum is full of fluid and bulging, it will appear so; both sides of the malleus handle may be pushed out, leaving a depression at the malleus handle, but the more usual site of the protrusion will be in the supero-post part of the membrane, and will give it the appearance of merging into the wall of the meatus. After the discharge, the membrane will look dull, whitish and sodden, from the maceration of its dermoid (outer) layer. If this is wiped off with cotton-wool—for it is often half detached—the membrane will be seen to be somewhat red. Perforations in recent cases may frequently be seen, but as they are often but a fissure in the membrane, and even if there were loss of tissue, the swelling of the membrane would be likely to close them. If the tympanum is inflated, air may be blown through the aperture (perforation whistle), or fluid, which completes the diagnosis. If there is pulsation of the membrane, probably there is perforation. If after cleaning the ear with absorbent cotton, it soon grows moist, most likely there is perforation; or if after cleaning the ear, a light reflex is seen, there is almost certain to be a perforation. In general terms, when the patient has had severe pain, followed by a profuse discharge, there has been a perforation. The diagnosis is not difficult. Severe throbbing pain in the ear, with lowering of the hearing, tinnitus aurium, autophony and swelling of meatus, are diagnostic; but all these symptoms may not be present in a given case. A pain in the ear from carious teeth may simulate otitis; but absence of redness of the membrane, hearing good, and no other ear symptoms, will exclude ear trouble. In children there will be difficulty; brain symptoms may simulate ear trouble, and inspection of the membrane will be required to make the differentiation. When the discharge makes its appearance, then doubt is usually set at rest. It may be well to apply the test of smell. If there has been even the smallest amount of discharge, it may be detected by the odor. The prognosis is usually favorable; the principal trouble is, it may involve the brain and destroy life, or cause a mastoid trouble of an obstinate nature, or go on to the stage of chronic suppuration with production of polypi, carious bone, cerebral abscess, &c. The cases dependent on scarlet fever are more likely to make a bad recovery. The causes are, taking cold, with sore throat, and the passage of the inflammation up the Eustachian tube to the middle ear, or exposure of the ear directly to cold is sufficient. All of the exanthemata are liable to give rise to ear trouble and whatever causes an inflammation of the naso-pharynx may excite it. All forms of violence inflicted on the drum membrane or cavity may cause this disease. Concussions from explosions, when the air suddenly strikes the ear, may give rise to the trouble. This naturally includes cannon firing, etc. A box on the ear may do it by suddenly compressing the air in the meatus; sea bathing, from cold water applied to the ear, and even getting it into the tympanum, from taking the water into the mouth, when it passes up the Eustachian tube. The nasal douche used unskillfully, and we fear too often when used with precaution, may give rise to this affection.

Treatment.—The pain is the first point to be considered in treatment. One to three leeches applied to the post. face of the tragus, is the best plan to begin with. If the leech takes hold of any point about the orifice of the meatus it will do, but in the rather firm cartilage of the concha, inflammation may result from the leech bite; occasionally the leech will aggravate the pain, when a hypodermic injection of morphine may be administered which acts as a true anti-phlogistic, as well as an anodyne. Leeches may be repeated if necessary every day or two as long as the pain or feeling of fullness continues, but do not depress the patient by too much abstraction of blood. Milder measures of relief are, dry hot applications; as a rubber bag, or glass bottle of hot water, the temperature being adjusted to the comfort of the patient. Water too hot or too cool will aggravate the pain. Common salt heated and placed in a bag gives relief. Moist applications relieve the pain, but if continued too long will macerate the parts, predisposing to otorrhœa and otherwise doing harm. A roasted onion applied to the ear often acts well. The patient had better sit up rather than to lie down, as the throbbing is not so severe. In children, a little paregoric on cotton is serviceable, or even Majendie's sol. of morphine may be cautiously used. A bit of cotton with black pepper wrapped inside of it will warm up the parts and relieve pain. Let it be tried on an adult first so as to prevent excessive burning. Atropine gr. iv. to the ounce of water may be dropped into the ear very cautiously. If there are any signs of poisoning, the pupil will dilate soon enough to give warning. This is also good in adults. Steam blown into the canal will relieve, so also will vapor of chloroform.

If on inspection the membrane is convex or from any other signs there appears to be a collection in the tympanum, paracentesis will be more appropriate to the relief of pain than leeches, besides being in a general way more rational treatment. For this purpose a broad needle from an ophthalmic surgeon's case, will be the best instrument. If the shank is extra long it will be all the better. Poise the instrument over the most protruding portion of the membrane, and approach very near to it, for the ext. canal may be pricked instead of the membrane, and by a gentle thrust push the instrument forward until it touches the bony wall of the tympanum. If the instrument is held loosely in the fingers it will be less likely to make a violent thrust. If no discharge follows the puncture, then inflate. By inclining the head to the same side as the affected ear, all the discharge may be blown out. This operation may be repeated every day or two until there is no longer any collection. If after a puncture there is a relief to the ear symptoms and the old symptoms recur after a few hours or days, another collection may be suspected.

After the pain is subdued, keep cotton wool in the ear, and remove it as often as it becomes moistened. After two or three days, the drum cavity should be inflated and if the discharge does not show signs of lessening in from four to six days—in the meantime the ear being kept clean by injection and syringing with warm salt and water (ʒ i to the Oj) and carefully wiped out and dried once or twice daily—we may begin astringents. Plumb. acet. gr. ij. to v., to the ounce of water, poured into the ear twice daily, after syringing. (Syringe very gently so as not to cause a return of the throbbing pain). Arg. nit. of the same strength used in the same manner may be recommended. Acid carbol. ʒ i to Oj. of water may be used in the same manner; the latter is disinfectant. A great variety of astringents may be used, but none should cause excessive pain or make the ear throb afterwards. If the discharge does not disappear after this treatment, fill the canal with finely powdered boracic acid, let it be well packed in by means of the cotton, on a holder, and allow it to remain until the discharge moistens it when it may be syringed out and renewed. Stronger solutions of arg. nit. may also be used, running up to 80 or 100 grs. to the ounce, provided the ear has shown a toleration for such applications.—Oren D. Pomeroy.

EAR, Eczema of the.—Is a kind of catarrhal inflammation of the skin. It often seems to depend on eczema of the face or hairy scalp. Acrid discharges from the ear often develop it. Exposure to cold, especially if the patient is depressed from any cause, will develop it. Struma is a predisposing cause. Dentition excites this disease into action. The auricle is intensely red, tender, hot, tense, and swollen. The vesicles are well developed and discharge freely, and dry into crusts, which fall off, leaving a dull, red surface beneath. Eczema impetigenodes may be present if the auricle becomes considerably hypertrophied, and accompanied by abscesses. The acute variety is more often seen in children; and in the adult the chronic variety more frequently results, in which there are few or no vesicles, and the part will be dry, scruffy, fissured, hypertrophic, with some distortion of the auricle. It is likely to extend to the meatus; may have considerable deafness, tinnitus, and a stuffy feeling in the ear.

Diagnosis.—At some stage of the disease there will have been moisture about the parts. Vesicles are not usually found, but on the edges of an old spot of redness, a few vesicles may occasionally be seen. In intertrigo there are no vesicles. Herpes is not a moist disease.

Treatment.—When covered with scabs, remove by poulticing; then bathe with bran-water. Acetate of lead and powdered opium, of each a ℈j, added to a pint of boiling water, may be applied to the parts by bits of lint. This will allay the irritation. Common whiting, made into a paste with water and brushed on, is serviceable. It protects the parts from the air, and is soothing. Bismuth, camphor and starch, equal parts of each, powdered and dusted on the parts, tends to diminish the discharge and allay irritation. Wash off, and re-apply once or twice daily. Vaseline alone, or with 1 or 2 grs. of the red precipitate to a ℥i, is a good remedy to cover the parts with. Linimentum calcis may often be recommended. In rather chronic cases the stimulating effect of rubbing common yellow soap into the part, will act well. Argent nit. grs. x to xxx to the ounce of water, or tr. of iodine may be painted on the parts, after acute symptoms have subsided. Oiled silk may be used to protect the parts during the treatment. Collodium is often serviceable. The constitutional treatment should begin by correcting any condition of the stomach or bowels that interferes with the assimilation of a proper amount of food, and very great care needs to be taken with the administration of food, especially with children. Frequent bathing of the whole body is indicated. Tonics, iron, cod-liver oil, etc., are frequently indicated. General attention to the health by proper exercise in the fresh air is often urgently called for. Fowler's solution is frequently indicated. Sometimes small alterative doses of hyd. bichlorid, either with or without potass. iodide, is useful. For some time after the patient is cured, great care about exposure of the part to cold is necessary.—OREN D. POMEROY.

EAR, Erysipelas of the.—Simple erysipelas occasionally attacks the auricle. It is ushered in by febrile symptoms lasting two or three days, which subsides on the appearance of the eruption. The auricle has a burning or smarting feeling, with symptoms of tension. It is red, swollen, shining, and puffy. Edges of the patch are raised, and the parts are hot and tender. In two or three days blebs form, then burst, and dry into scabs, when convalescence sets in, and the cuticle peels off. Hearing may become diminished by closure of the meatus from swelling. Involves the auricle from extension of the disease from other parts. Cold or traumatism may develop it. Leech bites sometimes excite an erysipelas. It is more frequently seen in women than men. Its duration is from 8 to 12 days. The prognosis is favorable, there being no destructive processes as in the phlegmonous varieties. Diagnosis from erythema is by the absence in the latter of the tense, shining, smarting blush, and of the implication of the subcutaneous connective tissue, so characteristic of the former.

The Treatment.—Manage the pyrexia in the ordinary manner. Avoid cold applications for fear of damaging the hearing. A weak lead and opium wash or poppy fomentation may be used. Protect from the cold.

Later on tr. iodine painted on the auricle will give great relief, although at first it will pain somewhat. The constitutional treatment is very important. Tr. ferri. chlo. in large doses 4 or 5 times a day, with or without quinine may be given. Stimulants may be necessary, and the nutrition needs to be carefully attended to.—Oren D. Pomeroy.

EAR, Furuncles of.—Circumscribed acute inflammatory swellings in the auditory canal resembling in most of their characteristics the ordinary boil or furuncle, are very frequently met with. They are located in the outer portion of the meatus, and seem to occupy the site of a hair follicle or a sebaceous gland, may be just beneath the skin, or in the subcutaneous connective tissue or even beneath the perichondrium or periosteum. The latter forms are very rare and are more serious in their character than the others.

Symptoms.—The meatus may be swollen so as to be closed, or the exact cite of the tumor may be determined, and is exquisitely sensitive to the touch. There may be some fever accompanying the attack. The pain is considerable and may extend to the whole side of the head, but it does not throb like middle ear pain. Deglutition or dragging upon the auricle will cause pain. Deafness ordinarily results only when the canal is considerably swollen. After one, two or three days the furuncle will burst leaving a very small opening through which a minute amount of thick pus reluctantly escapes. It will be necessary to frequently syringe it out. The inflammation under neglect may extend to the whole canal, causing a diffuse inflammation. Granulations may appear about the perforation. If the boil is deep in the ear we are likely to have some inflammation of the tympanum. The discharge may irritate the canal, exfoliate its epidermis by maceration and excite a diffuse inflammation. Tinnitus is rarely present.

The Diagnosis is from acute middle ear trouble with great swelling of the canal; but in the latter there is no localized tenderness, and we have added, the symptoms of the middle ear trouble. Fluctuation in the furuncle will settle the diagnosis; this may be determined by touching the tumor with two probes as in other cases the fingers are used. The ostotic tumors of the meatus are very hard and are more likely to exist in both ears, and hardly ever are mistaken for furuncles. These tumors may be caused by the use of strong solutions of arg. nit. in the meatus. The effect of cold, especially if the patient is depressed or has a strumous tendency, will cause it. Painful dentition, traumatism. The latter may be sufficient when the patient picks his own ears in an effort to clean them. I generally observe more furuncles in warm weather; sometimes the number is so large at this time as to make one suspect an epidemic influence.

The Treatment before pus has formed, is often to keep down the pain by anodynes as well as may be. Leeches sometimes do good, but by no means always. Place them as near to the swelling as possible, and use only one or two. The warm douche is often effective. Poulticing, if not continued too long, will do good; dry warmth generally is satisfactory. Painting the furuncle with a very strong solution of arg. nit. will sometimes decrease it, and in any event is likely to relieve pain. Tr. iodine may be used in the same manner and for the same purpose. As to incision of the furuncle before pus has formed, I have done it, but on the whole m not in favor of it. When considerable blood flows it sometimes does good. It is a painful operation. After the formation of pus there is then no question about the propriety of incising. By touching the furuncle with a probe you may detect the spot at which pus may be found, as it will be slightly softer than the other parts. Incise by a puncture with a Graefe's extraction knife, making a small opening. If the pus does not follow, pass in a small-sized probe and move it about, and the pus will make its appearance. It may be less than one drop, but will relieve. This operation must be done with a forehead mirror, so that every step is carefully taken. After a few hours the ear may pain again, then reopen the puncture and press out more pus by means of the probe. This may be repeated as often as the symptoms recur. If the discharge continues long enough it will soften the epidermis of the canal and perhaps excite an otitis externa; if so, use astringents, as a 2 gr. sol. of zinci sulph. or plumb. acet. or arg. nit., two or three times a day. If the canal is wiped clean of adherent epidermic scabs and sticky secretion previous to the astringent application it will be more effective. Sometimes granulations or polypi cluster around the unhealed aperture of the furuncle. These may be treated in the usual manner; use snare or forceps if of considerable size, and caustics and astringents if smaller. After the patient is nearly convalescent, the canal may still be left somewhat tender and reddened. In such cases I paint over the part very lightly with tr. of iodine. Wear cotton wool in the ear sometime after the furuncle is convalescent. As to constitutional treatment, probably quinine will be the best remedy to prevent relapses and facilitate recovery. A generous diet and perhaps stimulation may be recommended. Sulphide of calcium has been highly extolled to prevent the formation of pus during a phlegmonous inflammation, and it may be tried here in one-tenth gr. doses four or five times daily, but be careful about stomach symptoms.—OREN D. POMEROY.

EAR, Herpes Zoster of.—Herpes Zoster of the auricle is of the same nature as that found in other parts of the body. It is characterized by the presence of vesicles, larger than those of eczema, situated on an inflamed base, which, except when found in the meatus, do not rupture. They disappear in about a week. For about eight or ten days previous to the appearance of the vesicles, there may be severe neuralgic pain, which subsides when the vesicles form. The latter are accompanied by heat, tension, and burning; fever generally ushers in the attack. Prof. Gruber, of Vienna, regards this disease as one of very great gravity. It is likely to involve the meatus and even the tympanic membrane, and may cause considerable deafness. Cases of pain about the ear, which seemed inexplicable, have been readily explained by the subsequent appearance of herpetic vesicles. The eruption occurs more frequently on the anterior and upper surface of the auricle in the neighborhood of the better nervous supply, from the auricular branch of the pneumogastric. There seems no question but that the disease is the result of a neurosis. The "cold sore" of the lips will give a good idea of the causation of this disease. Any catarrhal inflammation of the ear will develop it. Pneumonia or a fever, or any direct exposure to cold, or any unnatural disturbance, will develop it. Arsenic administered internally has been known to result in herpes. It bears a strong resemblance to an eruptive fever. The neuralgic pains and fever preceding the eruption, assist greatly in the diagnosis. The vesicles are larger than eczema and smaller than pemphigus. They are situated on an inflamed base, and do not rupture, except when in the meatus. The short duration of the disease and its regular course differentiates it from other similar affections. The prognosis is favorable, except in the feeble and the aged, when great efforts are necessary to sustain the strength. The vesicles sometimes leave deep ulcers behind which are often healed with difficulty. The deafness is recovered from, but considerable time must elapse.

Treatment.—Protect the parts from exposure, as the disease is self-limiting. A good plan is to cover the auricle with vaseline, sprinkle on flour and cover with absorbent cotton, or 5 or 10 grs. of plumb. acet. may be added to the vaseline. Collodion sometimes is a good application; diachylon salve with morphine relieves the pain. Camphor and belladonna liniments, of each equal parts, make a good application. In the moist meatus, use a wash of zinci sulph. (Gruber), or it may be brushed over with a strongish sol. of arg. nit.; 5 or 10 grs. of plumb. acet. to the ounce of water, makes a good preparation to pour into the ear once or twice daily. If there is considerable pain, inject morphine under the skin. Stimulants and tonics will be often necessary, and a full, rich diet. —OREN D. POMEROY.

EAR, Horny Growths of the—are occasionally met with. I have observed two or three cases. They evidently consist of an hypertrophy of the epidermis. One in particular I remember, was a growth on the upper part of the helix, more than half an inch in length, tapering at its extremity, and was of horn-like hardness, but much softer at its attachment. It occurred in a young man, and had been seven months in growing. It was somewhat tender to the touch at its attachment, and was of the yellowish color of horn. It was removed by an incision extending rather deeply on either side, and the wound was closed by sutures. It did not return, although they are liable to if not properly removed. Buck and Burnett report similar cases. In Buck's case the growth had been sliced off several times by a razor in the hand of the patient, but it returned. After the removal by Dr. Buck it did not return.—OREN D. POMEROY.

EAR, Impacted Cerumen in.—The normal secretion of the cerumen of the ear seems to be disturbed by apparently trifling causes. Almost any affection which causes hyperæmia, seems to influence the quantity and quality of the cerumen. In early stages of ear trouble, the cerumen will be secreted in too large quantities, and its consistency will be increased, even to an almost solid, and usually dark mass. In very chronic cases a total absence of cerumen is frequently observed, as though the glands had become atrophied. The hearing is almost always diminished from (1.) the impaction. It may be very excessive. If the impaction has the smallest fissure in it, there may be good hearing, when all of a sudden the ear becomes deaf. This is easily explained by the fact that water may get into the ear and soften the wax so that it may settle and close this fissure, or an effort to dig out the obstruction will accomplish the same result. (2.) The pressure of the cerumen may cause the membrane to sink, or it may prevent free vibration. (3.) The previous diseased condition may have already lowered the hearing. The tuning fork is usually heard best in the obstructed ear. Tinnitus is a frequent symptom and needs no explanation here.

The *treatment* is mainly to remove the mass. I cannot understand how some writers of acknowledged great ability, recommend removal of cerumen by the spoon or some analagous method. I have never, except in very rare instances, resorted to any other method. In the transactions of the American Otological Society for 1872, p. 62, I have reported 100 cases of impacted cerumen in which only 2 are recorded where the cerumen was insoluble in water and required to be removed by the spoon or by breaking up the mass with a sharpish, pointed instrument. Dr. Blake in the Transactions of the American Otological Society for 1878, p. 183, speaks of certain cases of cerumen where it was pasty in character, mixed with epidermis which also surrounded it, and which was insoluble in water and could not be removed by syringing. A saturated sol. of carb. potass. was passed in by means of the cotton holder, touching the center of the mass, saponified it and enabled it to be removed by the syringe. As a rule I use nothing but warm water and the syringe. My own instrument, manufactured by Tieman & Co. of N. Y. seems to me a good one. It has a flange which prevents the return current from spurting into the operator's face. Its nozzle is very long and of small calibre, so that a stream of high intensity may be obtained. The auricle should be caught in the left hand and drawn upward, outward and backward, so as to straighten the meatus; the syringe is pointed successively to every side of the mass so as to act like a wedge or lever upon it. Ordinarily even when impacted, the mass comes out nearly or quite whole, and after a few seconds of syringing. Properly done, the cerumen should be removed at one sitting. As long as a mass of cerumen is known to be in the meatus, considerable force may be used, but not afterwards. Sometimes the patient may feel faint and dizzy, and occasionally he may fall in a sudden syncope, but I never have known other harm to result from syringing. After the removal test the hearing and if not perfect inflate and note the result. The collapse of the membrane from cerumen is recovered from in a little time and only requires a few inflations. Cotton wool should be worn in the ear for a few days after the syringing. In the article before referred to, I noted as concomitants of impacted cerumen, that sometimes an acute otitis externa had resulted from the presence of the cerumen, and in several cases there was redness of the canal and membrane. In one case several large granulations were observed, showing that there had been a chronic suppurative otitis media. The redness of the canal and membrane disappear in a day or two, unless in the very exceptional cases of acute inflammation. The dermoid layer of the membrane may be somewhat exfoliated so that the light spot is obliterated, but I have seen it restored so as to emit a light reflex in 48 hours after the removal of the cerumen. A variety of expedients have been resorted to, to prevent the recurrence of the cerumenous accumulation. I have had better success with tr. iodine painted on the canal, than with any other remedy, but in many cases it will return in spite of treatment.—OREN D. POMEROY.

EAR, Intertrigo of.—Occurs in children, and consists of an excoriation behind the auricle, commencing in the sulcus corresponding to the point of attachment of the auricle to the side of the head. It is always moist except when covered with scabs. If left to itself it tends to extend and may develop into an eczema, or something closely resembling it. It depends on a thin irritable skin, which may be found in the healthy as well as the strumous. Moisture and uncleanliness favor its development, but the direct cause is friction between the post. surface of the auricle and the side of the head. It is similar to that disease of the same name found in the groin. Too much head covering, which moistens the part by perspiration and presses the auricle against the side of the head, develops it.

Treatment.—Remove the conditions on which it depends, and protect the excoriated parts by sprinkling on powered starch; previously clean by bathing with warm water containing a very slight addition of baking soda. Vaseline on absorbent cotton or lint may be sufficient to cure. Oxide of zinc added to 7 or 8 parts of starch is a good "drying" remedy. Lint soaked in camphor water ℥ i and borax gr. x, is a good remedy. Plumb. acet., one gr. to the ʒ i of vaseline may be recommended. When the excoriation has mostly disappeared tr. iodine very lightly applied may complete the cure. Collodion is a good protection if there is not too much discharge, when it will peel off. In children of the lower class cleanliness must be insisted upon.—OREN D. POMEROY.

EAR, Middle, Subacute and Chronic Catarrh of.—In many of the cases of acute catarrhal inflammation of the middle ear the disease continues on with diminished hyperæmia; there may be little or no pain; possibly there is a slight discharge from the meatus, some throat symptoms, a moderate amount of deafness, with or without tinnitus aurium, the usual stuffy feeling in the ear, and autophony or unpleasant reverberation of the voice in the ears. Crackling sounds are heard, and whenever the patient blows his nose, sneezes or swallows, there will be crackling in the ears or other symptoms indicating that there is an unnatural interchange of air between the throat and tympanum. This is probably due to a relaxation of the faucial extremity, or mouths of the Eustachian tubes. In other cases the reverse obtains; the ear is stopped up, and the patient feels a constant desire to do something to "open" his ears to relieve them from a feeling of pressure and sometimes of actual pain, due to this condition. These symptoms may disappear in a few days, but on the next occasion of taking cold similar symptoms may arise. In another class of cases the patient knows nothing of ear trouble until he has a bad "cold," with sore throat, and similar symptoms to those just recounted occur. This form may completely recover without special danger of relapses. Still another form will arise as follows: the patient has had a naso-pharyngeal catarrh, perhaps for years, and gradually he finds the ears are slowly but surely losing their hearing; usually one is more deaf than the other. This is more likely to be the case if he is in the habit of using the nasal douche himself. Still another class of cases, which may be denominated "dry catarrh." In this are no ear symptoms except slowly progressing hardness of hearing and generally tinnitus aurium. There may or may not be throat symptoms; the hearing does not grow suddenly better or worse for a few days at a time, and the meatus will be preternaturally dry with insufficient secretion of cerumen. In most of the other varieties enumerated the cerumenous secretion is increased in quantity, even to impaction in some instances. Inasmuch as the hearing is ordinarily quite in excess of actual needs, a patient may lose a considerable portion of it and be unconscious of his loss, and in the more insidious forms of catarrhal deafness this is very frequently the case. The disease may attack any person, young or old. The principal predisposing cause seems to be a tendency to naso-pharyngeal catarrh, or what amounts to about the same thing, an indisposition to endure our inclement climate. The cases of dry catarrh, however, are an exception to this rule. Perhaps a rheumatic tendency aids in developing the latter form of otitis. This is more likely to attack the adult and aged rather than the young, and is a form of the disease not encouraging to treatment. As a predisposing cause to the more purely catarrhal form, tuberculosis may be mentioned, or struma. Excessive delicacy of organization, which, indeed, simulates struma where the patient has a thin skin, a sensitive, nervous organization, an inability to rough it, a necessity of obeying all the laws of health to keep well, and great sensitiveness and even irritability of the mucous membranes, act as predisposing causes to catarrhal otitis. Any of the causes of acute inflammation of the tympanum may operate here. On inspection the meatus may be impacted with cerumen, or unduly smeared with it, which is of too great consistency. In more advanced cases the canal will be much too dry, even being entirely devoid of cerumen. It may be scruffy and in some cases more or less red or tender, with a tendency to exfoliation of the epidermis. The drum membrane in a certain class of cases may be considerably reddened, especially along the malleus handle and short process, or even at the periphery. But the most frequent symptom will be that arising from malposition of the membrane. Obstruction of the Eustachian tube, or a failure in its muscles to properly open it so as to allow free interchange of air between the throat and tympanum results in a rarefying of the air in the tympanum, and the consequence is that the greater air pressure on the outer surface of the membrane than the inner, causes it to be pressed inward. This interferes with hearing, and causes the many symptoms of this disease through pressure. The chain of ossicula attaching the membrane to the oval window, are pushed inward, and the base of the stapes is driven with more or less force into its windows, compressing the waters of the labyrinth and through them the terminal filaments of the acoustic nerve. The compressed condition of the ossicula also interferes with their free vibration. Add to this the thickening of the membrane of the round window, and of most of the other parts in the tympanum, still further interfering with vibration, and the pathological picture is reasonably complete. The membrane is known to be sunken by, 1st, the foreshortening of the malleus handle, that is, it is drawn inward and looks shorter than normal; 2d, the prominence of the short process. The latter being the other end of the lever, turns out, as the malleus handle is drawn in; 3d, the membrane is thrown into folds; conspicuous among these are the anterior and posterior folds, which pass forward and backward from the short process; 4th, the light spot is out of its normal position, and is usually diminished in size. If the membrane has been thickened from inflammation of its mucus or internal layer the light spot will look too bright; if the dermoid or outer layer has lost its polish as a consequence of inflammation, it will be too dull or may disappear altogether. In any event, when the membrane has become thickened from inflammation, it will lose its translucency; its normal pearly gray, will give place to a dead whitish gray, and the color will look flat. Occasionally the malleus handle will, although retracted, appear more prominent than the membrane, in front and behind, in consequence of collapse of those parts. The direction of the malleus handle may be too vertical in some instances, and too horizontal in others. In dry catarrh the tendency of the patient is to grow more deaf, until he no longer hears anything but words spoken in the loudest tones. In those cases, having a strong constitutional tendency to struma and tuberculosis, the prognosis will be somewhat discouraging. In most of the remaining cases there will be much to be done to effect a permanent cure in some cases, and in others the frequent relapses may result in considerable deafness. This disease may ordinarily be differentiated from labyrinth trouble by the fact that the tuning fork, when placed on the teeth or centre of the forehead, will be heard longest in the worst ear. Observations made at several sittings may be necessary to settle this matter properly.

In the treatment, the indication will be to arrest the inflammation, thereby restoring a normal function to the Eustachian tube; to cause inflammatory exudations into the middle ear to be absorbed; and to blow air into the middle ear through the Eustachian tube, in order to restore as far as possible the sunken position of the membrana. The first indication is met by treating the catarrh of the naso-pharynx. In a few cases it will be necessary to inject salt ʒ i. warm water O i. into the naso-pharynx by means of the catarrhal syringe, throwing the fluid behind the velum, but not in excessive quantities. The bent tube is attached to the syringe by a rubber tube, as I have used it; this enables the operation to be done with less violence. Syringe as little as possible, for fear of injecting the tympanum by mistake, and exciting an inflammation. For the catarrhal condition, arg. nit. of a strength of 2 or 3 grs. to the ounce up to, sometimes, 30 or 40 grs., is a good method. Be sure, however, that the arg. is agreeing with the patient, it will sometimes aggravate. Carbolic acid, ʒ i. to O i., or even weaker, may be used in the same manner, but do not let it touch the outer border of the nostrils, as it causes too much irritation. Pot. chlorat. in saturated solution may be used. Tannic acid, gr. ij. to v. to the ounce; zinci. sulph., gr. ii. to x. to the ounce; chloride of zinc, 1 to v. gr. to the ounce, may be used. All of these may be repeated every two or three days, but do not overstimulate. A very gentle method is to use a medicine dropper, and empty the instrument filled with the astringent into the anterior nares and allow it to fall into the pharynx.

The same remedies, but somewhat stronger, may be injected against the mouths of the Eustuchian tubes, and perhaps a little way within them, by means of the Eustuchian catheter. A few drops only should be used. My own faucial catheter is a good instrument for this purpose, and I am in the habit of using it, rather to the exclusion of other methods. My mode is to attach the faucial catheter to a rubber bag; place a drop or 2 or 3 of the astringent, which frequently is a 40 or 60 gr. sol. of arg. nit., upon any convenient place; then draw it up into the catheter by compression of the bag; then inject against the mouth of the Eustachian tube, and simultaneously the tympanum will be inflated with air. In addition to this, astringent gargles may be used, although the region of the Eustachian tube will not be reached by them. Solutions of tannin, alum, muriate of ammonia, carbolic acid, chlorate of potash; simple carbonic acid water, and sometimes ice water may be used. The muscular effort of gargling seems to act favorably on the muscles which open and close the Eustachian tubes, and may for that purpose be recommended. Any spots in the throat of excessive redness may be touched with a strong solution of arg. nit (grs. xx to lxxx to the ounce). If the uvula is pendulous it may be incised provided cauterization and astringents do not reduce it to a proper condition. Enlarged tonsils may be removed, mainly to prevent relapses of throat trouble. I believe they are too far from the mouths of the Eustachian tubes to have much mechanical influence on them by pressure. It is important to keep the nostrils open so that mouth breathing may be avoided, as in case of closed nostrils the proper balance of air in the tympanum and throat is disturbed, (in strong inspiration air would be drawn from the tympanum and in expiration would be forced into it), which would be likely to excite hyperæmia. To fulfill these indications, growths may be removed from the nasal fossa when they obstruct free respiration. This would include hypertrophic swelling of any of the turbinated bones, or of the mucous lining of the nares. Any bony closure of the nares may be removed by the dentist drill. In the N. Y. *Record*, for June 11th, 1881, is a case of the writer's where a complete closure of one nostril by bone, was removed by a burr drill, propelled by the dental engine. Dr. Andrew H. Smith of N. Y. has an apparatus for removing hypertrophies of the mucous membrane lining the nostrils, which works very simply and effectively. Of the many methods of inflating the tympanum in order to force the membrane outward, the best is Politzer's. The patient having the nozzle of an air bag inserted into one nostril, while the other is closed by pressure of the fingers of the operator, when he is directed to swallow; at the same moment the air bag is compressed and air is forced into the nares; the velum by the act of deglutition is forced against the back wall of the pharynx, cutting off the communication between the pharynx and nares, and the Eustachian tubes being opened by this same act of deglutition, air is of necessity forced into the tympanum. Valsalva's method is to hold one's nostrils and make a forcible expiration, the mouth also being closed, and the air is forced so violently against the mouths of the Eustachian tubes that it enters the tympani. Naturally this does not as readily succeed as Politzer's method, and is likely to congest the blood vessels of the head rather unpleasantly. In children, simply force the air into the nostrils by means of the air bag. Whenever the hearing can be improved by inflation it is indicated to do so, except a too frequent inflation will destroy the elasticity of the membrane; it must however be remembered that it is only a palliative or temporary measure; the Eustachian tubes must be restored to such a state as to allow air to pass into the tympanum naturally and obviate the necessity of inflation. The tinnitus aurium accompanying this disease is frequently relieved in some of the less confirmed cases, by the inflation, as in many of these it simply depends on pressure on the labyrinth waters and through them, on the filaments of the acoustic nerve. In the more acute cases the noise depends on hyperæmia, and disappears after subsidence of the congestion. Recently attention has been called to the constitutional treatment of dry catarrh by Dr. Samuel Theobald in the *Medical News* for Feb. 4th, 1882, in which the old doctrine taught by Wilde and some of the writers of his times is ably defended. He believes in the long continued administration of mercury and iodide of potass. He has a preference for one gr. of the biniodide with 2 grs. of potass. iodid. and administers from $\frac{1}{48}$th to $\frac{1}{8}$th of a gr. of this mixture t. i. d., dissolved in water. When this seems to disagree, he uses the bichloride with a larger dose of iodid. potass. This may be continued for months. If the doctrine of increased activity of absorption from the use of mercury is true, there certainly is good ground for its administration here. In all our treatment it must not be lost sight of that the better the patient's constitutional condition is, the better he will get on with his deafness. His nutrition should always be kept in the best possible condition. Every minute *law* should be obeyed. Never do anything which "disagrees" with him. Moderation in labor; for a sick ear always behaves worse when the patient is fatigued or worried. The functions of the skin should be very carefully attended to. Bathing as often as possible without depression is to be recommended. Friction of the whole body with a crash towel or hair mittens is always indicated. The patient should make a solemn resolution to never "take cold" again. The ears should be so protected as never to feel uncomfortable on account of the cold, for the ear under all circumstances loves the warmth.—OREN D. POMEROY.

ECLAMPSIA—*See Convulsions.*

ECTHYMA.—This disease is characterized by the development of large, isolated, painful, deep-seated pustules, which have hard and inflamed bases. These pustules give rise to unhealthy ulcerations of a greater or less degree, and the crusts that form are large, dark, and firmly adherent. This disease occurs mainly in the badly nourished and cachectic. It may be excited by local irritants, especially in children by acari, and in elderly persons by pediculi. In fact, in the majority of cases ecthyma is a secondary occurrence, as in scabies or pityriasis; nevertheless the pustules may be excited by scratching or irritants alone, and as a primary condition in the badly nourished. This is observed in those whose occupations subject them to exposure to special irritants, such as the contact of lime to the skin. In syphilis ecthyma may occur, but here its pustules are associated with other well-marked syphilitic eruptions, whilst the surface is very dirty looking and ulcerates and scabs freely.

Treatment.—If the ecthyma is secondary to scabies or pityriasis these diseases must first be treated in the usual way, and then tonics may be administered subsequently, when the ecthyma will disappear. It may be necessary to apply the following locally to heal the ulcerations:

℞ Carbonate of lead...........................	gr. iv
Glycerine....................................	ʒ j
Simple cerate................................	℥ j M.

If the ecthyma be idiopathic it will probably be desirable to give aperients and rectify existing cachexia or debility by good food and tonics, with or without cod-liver oil, applying the local remedies mentioned above. If there be marked ulceration the sores may be cleansed by two or three applications of iodoform.—*Epitome of Skin Diseases.—T. Fox and T. C. Fox.*

ECTROPION—*See Eyelids, Diseases of.*

ECZEMA.—*Definition.*—Eczema is an acute inflammatory disease of the skin, characterized by an erythematous papulo-vesicular or pustular eruption, which usually gives rise to a moist, reddened surface, and from which a serous discharge that stiffens linen exudes freely. In the latter stages it takes the form of a dull-red or brownish surface covered with scales. A sensation of burning or marked itching accompanies it.

Symptoms.—The eruptions may present various appearances, as the disease, instead of going through the typical course above indicated, may stop short at any one of the stages mentioned, or pass over or abbreviate some of them and then remain stationary. In this way, instead of the red, excoriated, weeping surface most commonly seen, a condition which is almost entirely erythematous, papular, vesicular, pustular, or squamous, may be met with, and, according as one or other condition is most prominent, several varieties have been described.

Various secondary changes may affect the portion of skin suffering from eczema. Infiltration of the cutis and subcutaneous tissue, cracks and fissures, abundant pus formation, superficial ulceration, and the production of scabs are some of the phenomena most frequently met with. Scratching, in consequence of the intense itching, often excites a renewed attack, and contributes materially to the extension and persistence of the eruption. Eczema may occur without any obvious cause in persons otherwise healthy; it may be excited by various local irritants, chemical, mechanical, thermal, etc.; it may affect those who are gouty, syphilitic, or strumous, and it some instances it may be hereditary.

Digestive, uterine, and nervous disorders may predispose to or aggravate an attack of eczema, and should be taken into account in the treatment.

According to its course and duration, eczema may be divided into the acute and the chronic type, the latter being far the most commonly met with; but local varieties, differing in appearance according to their site, require special description. Eczema occurs in males more frequently than in females; of 6,798 cases recorded by Hebra, McCall Anderson, and others, 4,467 were males, and only 2,331 females.

Acute eczema is characterized by the occurrence of inflammatory redness and swelling of the skin, followed usually within forty-eight hours by the eruption of numerous minute vesicles, containing clear yellowish serum, and accompanied with a sensation of burning and tension. Within a week the vesicles either dry up and desquamate or burst, leaving red oozing points, or rapidly become pustular, giving rise, from dessication, to thin brownish or yellowish crusts, which in separating leave a reddish scaly surface, that itches slightly. A feeling of chilliness or slight pyrexia is usually the only constitutional symptom, and within a fortnight the whole eruption may disappear. More frequently, however, fresh crops are seen, either round the first or on different parts of the body, attended by severe itching, which causes violent scratching and produces excoriations. Successive acute attacks may thus prolong the disease, or it may pass into a chronic form.

According to situation, the appearances vary somewhat. On the face the redness and œdema of the skin are well marked, and may resemble erysipelas; the surface is, however, irregular and granulated, not uniformly smooth and shiny, as in the latter, and the disease is very prone to relapse and become chronic. On the hands and feet the eruption appears as a collection of small watery vesicles, with swelling and little or no redness at first, but they soon coalesce, and later on dry up; pain and tension are severe if the disease is extensive, but give place to itching as the eruption subsides. On the genitals swelling and redness form the main phenomena, the vesicles being usually small. Hebra states that in the male, while the penis remains dry and the vesicles rarely exceed a pin's point in size, on the scrotum they are larger, and on bursting give rise to an abundant discharge

Repeated attacks usually cause the disease to become chronic.

Universal acute eczema is a rare variety, attended, according to Hebra, with but little constitutional disturbance besides a feeling of great chilliness. Different appearances are presented by the eruption, according to its site. On the face it produces the changes already described, on the trunk it resembles scarlatina which is beginning to desquamate, on the flexures of the limbs vesicles and raw weeping surfaces are more common, while on the scalp the abundant scabs which are produced by the secretion from the vesicles, and retained by the hair, form a foul-smelling, offensive-looking mass.

Chronic eczema presents appearances of the same nature as those met with in the acute disease,—viz., papules, vesicles, pustules, crusts, and extensive red, moist, and weeping, or dry, scaly surfaces.

The frequent relapses and the persistence of the disease cause a more abundant serous discharge, and the prolonged infiltration of the skin often gives rise to hypertrophy of the papillary body, with sclerosis of the cutis and subdermic tissues.

According as one or other lesion predominates, we may have eczema erythematosum, with simple inflammatory redness of the skin, followed by desquamation; eczema squamosum (often described as pityriasis rubra), with abundant formation of scabs on a reddened, infiltrated basis, with little or no discharge; eczema papulosum (frequently termed lichen eczematodes, etc.), with an eruption of small red aggregated papules; eczema vesiculosum, the vesicles being either small and rapidly bursting, or larger and by confluence forming bullæ where the skin is thick and dense, as on the hands and feet; eczema pustulosum, where, either from the beginning or soon after their appearance, the vesicles become pustular, and, drying up, give rise to brownish, yellowish, or black crusts, conditions which have been raised to the rank of a new and separate disease under the name of impetigo contagiosa; eczema fissum seu rimosum, where numerous cracks of varying depth in an erythematous dry or moist surface occur in places where the skin is normally thrown into folds; and eczema rubrum, where the red, infiltrated, excorciated surface, usually discharging profusely, is well developed. This last form is accompanied by severe burning heat, and later on by intense itching; constitutional symptoms—fever, headache, and digestive derangement—are well marked, and the surface presents numerous bright-red points of hyperæmia, from which fluid keeps continually exuding, like the drops of water on the surface of salt butter (Hutchinson). The disease described as ecthyma consists of an eruption of large flattened pustules on a red, indurated, slightly raised base, giving rise frequently to dark-brown, dense crusts, and unhealthy, sloughy ulcers; it is merely a form of pustular eczema occurring in debilitated cachectic persons living under bad hygienic conditions.

Of the local varieties of chronic eczema the following will now be described:

1. Eczema capillitii.
2. Eczema faciei.
3. Eczema articulorum.
4. Eczema manuum et pedum.
5. Eczema crurale.
6. Eczema genitale.
7. Eczema corporis.

1. **Eczema Capillitii.**—In eczema of the scalp, owing to the presence of the hair, which becomes glued together by the sero-purulent discharge, a dense, matted crust may be produced if the disease is left to run its course unchecked, until the entire scalp is affected. Pus, mingled with sebaceous secretion from the numerous glands, forms beneath the crusts, and pedi-

culi, their ova, and even maggots may find a resting place in the filthy, stinking mass. When occurring in discrete spots and in clean people the discharge and crusts are constantly removed, and the disease is easily recognized.

In the later stages, when the crusts have separated and the discharge is less in quantity, a red, infiltrated surface covered with numerous scales adherent to the hairs is seen.

This variety is usually pustular, occurs most often in children, and may persist for years if neglected. Subcutaneous abscesses and glandular enlargements are not unfrequently met with, especially in strumous children. In chronic cases there is some loss of hair, speedily renewed, however, when the disease is cured, except in neglected cases where profuse suppuration under the scabs has destroyed the hair follicles.

2. Eczema Faciei.—Eczema of the face, when it affects the hairy parts, resembles the former variety in the liability to the production of shallow pustules with a hair passing through them, which dry up and form yellow, greenish, or brown crusts. On removal they leave a red, moist, or scaly surface. In chronic cases the hair follicles become more deeply involved, as in sycosis; the skin is dusky, red, and thickened, and permanent alopecia is apt to follow from the destruction of the hair bulbs. Pain and burning heat, with later on some itching, accompany the eruption.

Eczema of the eyelashes, or tinea tarsi, frequently confounded with inflammation of the Meibomian glands, is merely a local eczema, implicating the hair follicles and glands, and is always accompanied by itching. Redness, swelling, and excoriations, and scabbing of the margins of the lids, with partial or complete loss of the eyelashes may be produced by it.

Eczema of the nostrils usually terminates in the formation of a thick scab, which felts together the margins and blocks up the orifice. The continual pus formation under it causes often an erysipelatous swelling of the mucous membrane or skin of the nose.

On the smooth parts of the face eczema is usually symmetrical, unless produced by purely local causes.

Eczema of the ears may occur merely as a moist fissure at the reflection of the auricle from the mastoid process, or as a weeping or crusted red surface at the back of the auricle, on the lobule, or elsewhere. The skin is prone to excessive swelling and discharge, which either drips away constantly, or dries up, forming stalactiform crusts. Hearing, always somewhat impaired, is made much worse when the meatus is affected and blocked up more or less completely by crusts and ceruminous discharge.

Eczema of the lips may present either a red, scaly, infiltrated or a moist surface. There is often marked œdema, with painful fissures or large yellow crusts.

On the cheeks and forehead large yellow crusts, looking like dried honey,—which gained for the disease in this site the names of crusta lactea and melitagra flavescens,—are most commonly seen.

3. Eczema articulorum occurs on the flexor surfaces of the limbs, and leads to slight contraction, with great pain on moving the subjacent joint. The skin, red, much infiltrated, and oozing or crusted, is traversed by numerous fissures, following the lines of the normal folds of skin, causing the application of the name eczema fendillé. Eczema rubrum occurs most freqently in these situations.

4. Eczema Manuum et Pedum.—The fissured variety of eczema is the most common, especially on the palms and soles, where the skin presents a dry, inelastic, thickened appearance, itches considerably, and is traversed by numerous, deep, painful fissures. The vesicular form, with large blebs, pustules, crusts, or moist surfaces, may also occur. Local irritants—water, sugar, lime, soda, soap, dyes, etc.—are the most common cases of eczema

restricted to the hands or feet; hence the so-called "grocer's itch," 'baker's itch," etc., are merely local varieties of eczema.

5. ECZEMA CRURALE is often mdified, and its typical features concealed, by conditions peculiar to its site, such as varicose veins, ulcers, scars, pigment patches, and œdema, leading to chronic dermatitis.

The disease hence arises sometimes around a varicose ulcer or scar, sometimes on a pigmented patch, and at others the œdema appears as if secondary to the skin affection; but in all cases eczema, whether as simplex, rubrum, or squamosum, is easily recognized.

6. ECZEMA GENITALI, ocurring in the chronic form, affects in the male the scrotum and penis either together or separately. On the penis it appears as red raised transverse lines; on the dorsum it is most marked when the skin is stretched, with a moister red area on the under-surface of the organ. Though itching is severe, and induces much scratching and excoriation, there is but little discharge. On the scrotum it may occur as an abraded red surface, comparatively free from infiltration, or as an irregular fissured or greatly hypertrophied elephantoid mass in inveterate cases, exuding an abundant sticky discharge, which, as it decomposes and dries up, becomes extremely offensive.

On the female genitals the disease affects the labia majora chiefly, and may extend to the nymphæ and vulva, or to the adjacent parts of the thigh and abdomen, and takes usually the form of eczema rubrum. When affecting the mucous membrane it causes an abundant blennorhagic discharge, resembling that of gonorrhœa, and there is usually much burning or itching. Appearing about the anus, it leads to the formation of painful itching fissures in the direction of the normal radiating folds of skin. There is often slight prolapsus ani, and the discharge is abundant and offensive.

7. ECZEMA CORPORIS, presenting the general characters of the disease as described, has some special peculiarities when it attacks the navel and nipples. The nipple and the adjacent areola are denuded of epidermis, red, swollen, moist, and painful; and crusts may form, under which either healing goes on, or increased secretion, which oozes under or through the scab, and is accompanied by severe itching and pain. It may spread gradually to the surrounding skin, and is very obstinate; but, once cured, it leaves but little permanent damage behind.

On the umbilicus it takes either the ordinary form of eczema rubrum or impetiginosum, or that of an œdematous projecting red surface denuded of epidermis, and discharging freely or covered with a yellowish or greenish-brown scab.

Eczema intertrigo occurs in the axillæ, between the nates, between the mammæ and chest, and in other places where folds of skin secrete much moisture and rub together, and appears as a moist, red, and tender surface, sometimes slightly excoriated.

The so-called eczema marginatum, formerly held to be a special variety of eczema, has now been shown to be merely one of the manifestations of ringworm of the body.

Diagnosis.—Eczema in one or other of its forms may sometimes be mistaken for the following diseases: Erythema, erysipelas, lichen ruber, herpes febrilis, miliaria, scabies, pemphigus foliaceus, psoriasis, pityriasis rubra.

In erythema the smooth isolated spots which generally appear on the backs of the hands, the sharply defined edges, the absence usually of vesicles, discharge, and crusts, and the slightness of subjective symptoms, form a ready means from separation from eczema erythematosum or papulatum, which have a rough—often vesiculate—surface shading off into the surrounding skin.

Erysipelas is separated from acute eczema by the marked pyrexia, which begins usually with rigors, by the smooth surface with well-defined edge, and the rapid spreading of the patches, by the affection of the lymphatics, and the greater severity of the burning heat and pain. Erysipelas, may, however, supervene on an attack of eczema.

Lichen ruber, which in aggregated patches may resemble eczema papulatum or squamosum, never becomes at any stage vesicular, and the isolated, flat-topped, shiny, solid papules that are found round the margin of the patch are quite characteristic.

Herpes febrilis, which occurs most commonly on the lips and prepuce, is distinguished from eczema of the same parts by the larger size and longer duration of the vesicles, and the absence of infiltration and itching. The vesicles dry up in a few days, and are not succeeded by fresh crops, as in eczema.

Miliaria differs from eczema in the fact that the vesicles occur in groups, usually on the abdomen and thorax, in the course of some febrile disorder. The eruption is of short duration, and is unattended by itching. In eczema, on the other hand, there is little or no constitutional disturbance, the vesicles are aggregated on a red base, there is marked itching, and the disease tends to become chronic.

In scabies the vesicles, pustules, and scabs which are produced by the irritation of the parasite, or the itching and scratching that it excites, are undistinguishable from those of eczema. Careful examination will usually show near the pustules the little dark lines of the burrows, with a terminal dilatation from which the acarus can often be extracted. The appearance of the disease on the hands and feet, wrists and abdomen, is also a suspicious circumstance.

Pemphigus foliaceus presents an appearance that is often difficult to distinguish from general eczema which discharges only slightly and is becoming scaly. The peculiar cachexia, the diarrhœa and marked weakness, and the pigmentation of the skin, together with the tendency of pemphigus foliaceus to begin on the front of the trunk, contrast markedly with the absence of cachexia and pigmentation, the itching and the tendency to infiltration and sclerosis of the skin, in eczema.

The condition known as eczema squamosum may sometimes be mistaken for psoriasis. The latter affects mainly the extensor surfaces instead of the flexors, as in eczema. The scales, thick, adherent and silvery, are seated on abruptly defined, dark-red patches, while in eczema the scales are thin, loose, not silvery, and the bright-red patches merge more gradually into the adjacent skin. Psoriasis is dry throughout, while chronic eczema always discharges at one period of its existence.

Pityriasis rubra, regarded by some as merely a variety of eczema, differs, according to McCall Anderson, in the uniform redness and defined margin of the eruption, extending gradually to cover the whole surface, in the rapid exfoliation of large scales, in the burning heat and comparatively slight itching, and in the absence of any considerable infiltration, while the punctate appearance of the skin, the papules, vesicles, and crusts are quite wanting.

Eczema of the hands and feet may, by the confluence of several vesicles under the thick palmar cuticle, acquire bullæ, which resemble those of pemphigus. Small vesicles and a definite eczematous eruption are usually present in the neighborhood, and prevent the possibility of error.

Both psoriasis and a tertiary squamous syphilide affecting the palms and soles may be indistinguishable from eczema, and only the discovery of evidences of these diseases on other parts of the body can determine the diagnosis.

The diagnosis of the principal diseases of the scalp is given in the following table.

ECZEMA.	SEBORRHEA.	PSORIASIS.	VESICO-PUSTULAR SYPHILIDE.	TINEA TONSURANS.	FAVUS.
1. Most frequent in children, in the debilitated or strumous.	1. Usually in adults.	1. Most often in healthy persons, rarely in strumous.	1. Usually in adults only.	1. Frequent in children.	1. No special proneness in strumous.
2. Often attacks the whole scalp. Ulcers, if any, superficial; crusts thick, yellowish, brittle; pus, epithelium and granular matter. Seated on red, infiltrated, moist, often excoriated surface, which shades off gradually into healthy skin and itches excessively.	2. Crusts are thin, oily, can be kneaded into masses; consist chiefly of sebum and epithelium on a smooth, oily surface; not, or only slightly, red, and non-excoriated or infiltrated; itching only slight.	2. Eruption usually white, scaly and silvery; dry from onset and throughout course; red base, only slightly infiltrated, and itching only slight.	2. In small patches usually; often deep ulcers with sloughy bases.	2. Patches usually circular, deficient in hair; crusts, etc., not necessarily present; itching slight.	2. Round, dry, sulphur yellow, cup-shaped crusts, penetrated by dull, brittle hairs, with abrupt edges and often bald patches.
3. Syphilitic history and phenomena only accidental, if present at all.	3. Usually no specific phenomena.	3. Usually no specific history.	3. Usually a history of primary syphilis, and presence of alopecia, nocturnal pains, etc.		
4. Distinct eczema often on other parts of body, on flexor surfaces or behind the ears.	4. Usually only slight, oily crusting on face near scalp.	4. Well-marked scaly patches, usually present on extensor surfaces of elbows and knees.	4. Syphilides, squamous, pustular, tubercular, etc., with coppery color, usually present on body.	4. Ringworm of body (tinea circinata) often present.	4. Cupped yellow crusts may be found on hairy parts of the body.
5. Hair healthy, occasionally falling out; no parasite.	5. Hairs often drop out.	5. Hairs only slightly affected.	5. Hairs fall out freely, and incurable alopecia may result.	5. Hairs twisted, thickened, whitish, broken off short, easily extracted; filled with trichophyton tonsurans.	5. Hairs dull, dry, brittle, easily extracted, loaded with achorion Schönleinii.
6. Non-contagious.	6. Non-contagious.	6. Non-contagious.	6. Communicable by inoculation, which produces a hard chancre, followed by constitutional symptoms.	6. Contagious.	6. Contagious.

Prognosis.—In itself the disease alone is never fatal. An ordinary attack of acute eczema runs through its various stages and subsides, leaving little or no trace within a week or ten days. Fresh crops of eruption arising near the original patch, or in distant parts of the body, may appear in succession, and prolong the disease for many weeks, verging gradually into the chronic form. The latter, with alternations, retrogressions, and relapses, may persist for months or even years.

Among the local varieties of chronic eczema the more limited the area of the patch the more obstinately does it persist in spite of treatment.

Treatment.—In the constitutional treatment the main indications are—first, to remove or modify any condition which predisposes to the occurrence of the disease; and, secondly, to give sufficient nutritious, easily digested food, and to forbid the use of stimulants.

Hence the action of the bowels must be regulated by occasional doses of the aperient mineral waters, such as Carlsbad or Hunyadi Janos. Gouty symptoms must be combated by colchicum and alkalies, and for strumous children cod-liver oil and iron is required.

In the acute forms antimony is of the greatest value, and, according to Dr. Cheadle, often does good when all other remedies fail. It should be given in doses of $\frac{1}{12}$ to $\frac{1}{6}$ of a grain two or three times a day. In the chronic forms arsenic, iron, quinine, and strychnine are of use as tonics, but none of them have any specific action on the disease.

In local treatment the indications are:

1. To use sedatives only, or mild unirritating applications during the acute stages, or in exacerbations of the chronic form.

2. To remove thoroughly all scales or scabs before applying local remedies.

In the stage of heat and tension dressing with simple cold soft water, or with a lead and opium lotion, is the best remedy to apply, but soap of all kinds should be avoided. Dusting powders of starch, oxide of zinc, or chalk may be tried. Crusts should be removed by softening them with oil or a bread-and-water poultice, and then scraping them off gently. After cleaning the part with oatmeal paste, or with simple water, the surface is ready for local applications. The best are mild solutions of tar or weak preparations of mercury; of the former the most convenient form is Wright's liquor carbonis detergens. It is an alcoholic solution of coal or tar, and mixes well with water; ʒ ij to the eight ounces of water is the strength which should be used at first, and should be gradually increased if the lotion is borne without pain or smarting. The following prescription from the Pharmacopœia of the Skin Hospital, Blackfriars, is of considerable value in allaying the itching and preventing the formation of fresh scabs:

℞.	Acetate of lead	grs. x
	Oxide of zinc	grs. xx
	Calomel	grs. x
	Citrine ointment	grs. xx
	Palm oil	℥ ss.
	Benzoated lard to	℥ j

In the chronic, inveterate, and localized varieties blistering in successive small portions may be tried, or the vigorous application of Hebra's spirituus saponatus alkalinus. Tar, or various forms of it and substances got from it, are most useful in the scaly forms of eczema; but if used at all in the acute stages it should be with great caution, as they are apt to produce fresh outbreaks of the disease. The substance itself, oil of cade, ol. rusci, or ol. fagi, may either be applied pure, or in ointments containing 1 to 8 or 12 parts.

In eczema capitis, after removing scabs by oil, poultices, and washing, the following ointment may be applied with advantage:

Bisulphuret of mercury	grs. vi
Red precipitate	grs. vi
Creasote	mij
Lard or vaseline	℥ j

(*Skin Hospital.*)

Eczema faciei.—After cutting short the hair and removing the scabs, an ointment of oleate of bismuth or zinc, one part to two of vaseline, should be applied on lint, and retained in position by a flannel mask.

Eczema in the ears should be treated by removal of the crusts, and by brushing out the meatus cautiously with a potash solution—5 to 10 grains to the ounce.

Eczema of the eyelids, or tinea tarsi, should be treated by removal of the crusts, epilation, and the application of one of the mild mercurial ointments before mentioned.

In eczema manuum et pedum wrap the affected part with strips of lint covered with zinc ointment, and apply some tar or other stimulant when the fissures are healed. Vulcanized india-rubber gloves, as recommended by Dr. McCall Anderson, are of considerable value when the cuticle is very thick and hard.

In eczema of the legs, after removing the crusts and dressing the ulcers with a weak tar or lead and opium lotion, strap the limbs with stout plaster, or better still with Martin's elastic bandage.

In eczema of the genitals, bathing with water, and dressing with a glycerin lotion, such as—

Glycerin	mxxiv
Oil of bitter almonds	mss.
Water to	℥ j

Diluted with 1 to 3 parts of water (*Skin Hospital.*)

in the day, and well smearing the part just before bedtime with the following ointment, will tend to remove the disease:

Acetate of lead	grs. x
Liq. carbonis detergens	mx or xv
Vaseline	℥ j

Eczema intertrigo requires little treatment beyond washing with soft water and the use of some dusting powder of vaseline, together with the careful separation of the parts by means of soft lint.

In eczema of the nipple painting with tincture of catechu is useful after the removal of the crusts, and in very obstinate cases Hebra recommends the thorough application of a strong potash solution as a last resource.—MALCOLM MORRIS.

ECZEMA MARGINATUM—*See Tinea.*

ELBOW, Dislocation of—*See Dislocations.*

ELBOW, Excision of—*See Excision of Joints.*

ELEPHANTIASIS ARABUM—*Definition.*—Elephantiasis Arabum is an enlargement of some part of the body, usually a limb, due to a hypertrophy of the whole of the connective tissue, following an inflammatory condition of the part.

Symptoms.—Under the name of elephantiasis several entirely distinct diseases have been included, and much confusion has resulted from the indiscrimnate use of the word; thus, elephantiasis Græcorum is simply leprosy, and elephantiasis Italica is another name for pellagra. It is especially common in hot climates, such as the west coast of Africa, Barbadoes, and Malabar. Its prevalence is not confined to any particular sex, age, or race, but various conditions have been suspected to be concerned in its etiology. It has been attributed to injuries of the veins and lymphatics, which have caused compression, and to lupus, and apparently with some reason to the gummata of syphilis. Elephantiasis Arabum begins with an erysipelatous inflammation of the skin, usually of the leg, which is accompanied with or preceded by feverishness and symptoms of general constitutional disturbance resembling, intermittent fever. These symptoms gradually subside, but some amount of swelling of the skin remains. After a variable interval the inflammation of the skin, with redness, swelling, and pain, returns again, accompanied with or preceded by symptoms of constitutional disturbance. The same subsidence takes place, but the local effects last longer than in the previous attack, and leave a greater amount of permanent œdematous swelling behind them. These attacks are repeated from time to time during a series of years, and thus a gradual enlargement of the limb takes place until it has attained huge proportions.

The skin is greatly thickened, shiny, stretched, and of a color varying from light brown to purple. Desquamation may be present, or the skin may be smooth and frequently fissured, when the natural furrows are greatly exaggerated, owing to the thickening of the skin, and when the epidermis is heaped up and macerated by perspiration. The surface may be surmounted with tubercles, the result of growth of fibro-cellular tissue, or with large papillæ, which may or may not be covered with epidermis. Sometimes the whole limb is covered with eczema, and occasionally the skin ulcerates, forming sores of varying size, from which a foul discharge exudes. Enlargement of the lymphatics causes them to stand up on the surface like vesicles, and when they burst or are punctured the milky lymph escapes. Each attack is accompanied by stabbing pains in the limb, but they are more severe at the beginning than at any subsequent period. Severe pain is, however, always felt if the limb be allowed to be in a dependent position for any length of time. Diminution of the sensibility of the surface also results from the disease. The enormous increase of the leg and foot when that part is affected, causes the obliteration of the instep and upper part of the foot, and makes it resemble the foot of an elephant, whence the peculiar name.

Elephantiasis of the genitals differs slightly from that of any other part, and affects the scrotum, penis, labia, and clitoris. It commences " in the form of a hard kernel under the skin, usually at the bottom of the left side of the scrotum." From this point the disease spreads, and the skin over it becomes thickened and wrinkled, while the shape of the abdomen undergoes alteration. The penis is also increased in size, but lies partially imbedded in the enlarged scrotum. The skin of its lower surface is pushed forwards, and is only connected with the penis round the glans. The hypertrophied scrotum becomes covered with dilated lymphatics, which at a later stage burst and permit lymph to exude.

The regions usually affected are the lower extremities and the genitals, but the upper extremities and ears may also be the seats of the disease.

Diagnosis.—Simple œdema is the only condition which bears the slightest resemblance to elephantiasis, but never leads to hypertrophy of the tissues.

Prognosis.—Elephantiasis may last a lifetime, and although it has no tendency to spontaneous recovery, it is, within limits, amenable to treatment.

Treatment.—The first thing to be done is to allay the inflammation by complete rest and, if possible, the elevation of the part affected, and by the application of warm poultices. After the inflammation has been reduced Hebra recommends the use of baths, poultices, and ointments to remove the accumulation of epidermis, and subsequently inunction with blue ointment. Bandages must next be applied to reduce the size of the limb, and Martin's elastic bandage is probably the best for the purpose. Ligature of the main vessel of the limb has been recommended, but with such slight success as hardly to warrant its general adoption.—MALCOLM MORRIS.

ELEPHANTIASIS GRÆCORUM—*See Leprosy, True.*

ELEPHANTIASIS TELEANGIECTODES.—*Definition.*—This disease is closely related to elephantisis Arabum, but differs from it in that it may arise without any previous inflammation and is usually congenital.

Symptoms.—This disease is either congenital or appears soon after birth, and is due to some obstruction of the lymphatics. The skin of a limb becomes hypertrophied, and hangs down in rolls or flaps, which vary in color, owing to the enlargement of the vessels, but if pressure be steadily exerted on one of these flaps its size becomes considerably reduced. Although the thickening of the skin which hangs from the lower part of a limb produces an apparent increase in the size of the limb, the upper part has really wasted, and this atrophy is not confined to the skin, but includes the muscles and bones. After a time a quantity of vesicles appear, which may be arranged in groups or lines or may be scattered irregularly, and when these are ruptured the lymph which they contain exudes.

Treatment—Is identical with that suggested for elephantiasis Arabum.—MALCOLM MORRIS.

EMBOLISM.—Signifies the conveyance of some solid body, small or large, by the current in a blood vessel, till it stops and obstructs some vessel. This obstructed vessel may be an artery, or a vein, or a capillary, and it may be in the systemic or the pulmonic circulation. The obstructing body is called an embolus, and is usually a piece of fibrin washed from one of the cardiac valves or from the clot in an aneurism, or from an inflamed vein. Where the embolus rests an abscess is apt to form. In regions where the collateral circulation is poor, *e. g.*, in the brain, death of the parts whose blood-supply is obstructed by the embolus may occur. When emboli are of a septic nature, they produce pyæmic abscess. Entozoa have been known to constitute the emboli.

EMMETROPIA.—*See Refraction.*

EMPHYSEMA OF CELLULAR TISSUE.—In surgery, means only the passage of air into the cellular tissues.

Causes.—Mostly wounds of lung, especially by broken ribs. Very rarely decomposition and consequent production of gas in a wound. The air almost always passes first into the pleural cavity, and is pumped thence by respiratory movements into cellular tissue.

Symptoms and Course.—The peculiar crackling feeling is unmistakable and pathognomonic. Unless the air continues to pass into the cellular tissue, it is soon entirely absorbed. The emphysema is first noticed near the wound, and spreads thence often to great distances. The rupture of an air cell in the lung may cause emphysema of the mediastina and the neck

Treatment.—Treat the cause; put a pad over the wound.

EMPHYSEMA OF LUNGS.—*Natural History.*—This disease occurs in two forms—(1.) Vesicular Emphysema, in which there is a misshapen enlargement of the several air-cells of the lungs, by dilatation of them and blending of them into one great cyst, attended with gradual effacement of the functional blood-vessels distributed over their walls; and anæmia of the lung in the affected parts, tending to dilatation of the right side of the heart, with anasarca. (2.) Interlobular Emphysema, in which air infiltrates the meshes of the sub-pleural and interstitial connective tissue of the lungs.

Some confusion has arisen from the use of the term "Emphysema" (which means the presence of air in the connective tissue) to designate dilatation of the air-cells of the lungs. Here the air is where it ought to be;

but the air-cells are too large and misshapen, and contain too much air, and being limited in this way to the vesicles of the lung, this form of disease was named by Laennec "vesicular emphysema." The dilated air-vesicles vary from the size of millet seeds to that of Barcelona nuts, or even larger; but when they form a great expansion, it is probable that many air-vesicles are dilated into one common cavity by rupture of the partitions which separate them from each other. The dilated vesicles may be seen clearly through the pulmonary pleura; they also protrude from the surface of the lung. The emphysematous parts are pale, and sometimes quite white; the tissue is drier than normal; it cannot be easily emptied of air, resembling the lungs of a reptile rather than those of a human being. It possesses fewer capillary vessels; and they become obliterated by distention of the air-cells. The lung is therefore anæmic, and contains less moisture than the normal lung. It is so dry and light that it floats much higher in the water than a healthy lung.

In typical cases the patient is short-winded and distressed by a constant sense of fulness and oppression at the chest, and generally seeks advice after suffering and discomfort have become too great for him to bear any longer. The difficulty of breathing is often aggravated by spasm, as in asthma; and emphysema is a frequent consequence of that disease—the one re-acting on the other, so that the phenomena of each are mutually aggravated. The physical signs are, incompleteness of the act of expiration, the thorax remaining prominent and round over the emphysematous lung. In spare persons the clavicles are not well defined. Percussion over the bulging parts especially yields a peculiarly clear and resonant sound; and although there is thus shown to be abundance of air underneath the part which yields such a sound, yet the vesicular murmur of breathing is extremely indistinct, showing the air is not in motion there. It is shut up in the enlarged air-cells. The disease tends to impede the circulation through the lungs, and so to produce hypertrophy, with dilatation of right side of the heart, nervous congestion of the head and face, attacks of palpitation, paroxysms of cough and dyspnœa, œdema of the feet and legs, general anasarca; and dropsical effusion is a frequent termination.

Treatment.—Apart from the management of the bronchial congestion, on the principles already given under bronchitis, little can be done for the special treatment of emphysema. If bronchial spasm prevail, Hoffmann's anodyne may give relief. It is the spiritus ætheris of the British Pharmacopœia, of which thirty to sixty minims may be prescribed in camphor water, or in spiritus ammoniæ aromaticus, or in volatile tincture of valerian; or it may be combined with stimulant doses (one grain) of opium; or with twenty minims of the æthereal tincture of lobelia, belladonna, conium; or æthereal tincture of Indian hemp and hydrocyanic acid may each in turn be found of service. Dry cupping between the shoulders often relieves passive pulmonary congestion; and if an attack is imminent, an emetic, or unloading the bowels by a dose of the compound jalap powder, may prevent its accession or moderate the paroxysm.—WILLIAM AITKEN.

EMPYEMA—*See Pleurisy.*

ENCEPHALITIS—*See Brain, Inflammation of.*

ENCEPHALOCELE—*See Meningocele.*

ENCEPHALOID—*See Cancer.*

ENCHONDROMA—*See Tumors.*

ENDOCARDITIS.—An inflammation of the lining serous membrane of the heart, covering the valves and lining the cavities of that organ, in the great majority of cases arising in the course of acute articular rheumatism, and all the more readily the greater the number of joints attacked. At the same time it is not improbable that an idiopathic chronic endocarditis is not uncommon. Bright's disease is next most frequently the cause of endocarditis, especially the acute form developed after scarlet fever. Acute infectious disorders, especially puerperal fever and measles, are also prone to be so complicated. In all such cases it seems not improbable that the irritant which sets up the inflammation, acting mainly on the tissue of the narrow passages through the heart—its orifices and valves—is the superheated blood of the fever patient, as marked by the intensity of the fever, besides other poisoned conditions of that fluid.

By a species of preference (the reasons for which are in a great measure speculative), the coverings of the narrow places, orifices, outlets, and valvular structures of the heart are by far the most frequent seat of lesion in the internal inflammation of that organ. The parts affected in endocarditis are also the parts on which the great tear and wear in the action of the heart is expended; and thus they are probably the first to suffer, owing to the mutual friction of the valvular edges upon each other.

Discomfort and uneasiness at the heart are most common symptoms, and more or less palpitation may be present. The impulse of the heart is almost always more extended and stronger than natural at the commencement of endocarditis, till infiltration of tissue takes place, when the pulse and force of the heart become small and soft. The heart's sounds undergo modifications as soon as the tissue of the valves becomes changed in texture, substance, and shape, by the inflammation.

The murmurs which accompany purely acute endocarditis are, in the order of their frequency: (1.) aortic obstructive; (2.) mitral regurgitant; (3.) aortic regurgitant; (4.) aortic obstructive and mitral regurgitant together. *See* Heart Murmurs.

When products of inflammation are apt to poison or spoil the blood, another class of symptoms and results are apt to be associated with endocarditis and valvular disease. Rigors, heat of skin, profuse perspiration recurring irregularly, dull, earthy-yellow discoloration of the skin (not of the conjunctivæ), diarrhœa, more or less bilious, pinched, anxious countenance, intense prostration, and muttering delirium announce this untoward occurrence. Secondary deposits in the lungs, the liver, or the brain are the records of its morbid anatomy.

Treatment.—What has been written relative to the treatment of pericarditis (which see) applies equally to acute endocarditis; but the management of cases in which the patients suffer from the valvular lesions and their immediate consequences demands the adoption of various lines of treatment, according to the causes or circumstances producing the disease.

When endocarditis seems lapsing into the chronic stage, the use of iodide of potassium and liquor potassæ, combined with bitter tonics, are generally useful.—WM. AITKEN.

ENDOCERVICITIS.—*Definition.*—Cervical endometritis. Inflammation of the mucous membrane of the lips of the uterus and the interior of the cervical canal.

Causes.—Impoverished blood, frequent pregnancies, subinvolution; displacements, excessive coitus, intrauterine pessaries, endometritis, vaginitis, obstructive dysmenorrhœa, mucous polypi, masturbation.

Symptoms.—Pain in back and loins, increased by exertion, opaque leucorrhœa, menstrual disorders, "nervousness," loss of general health, dyspareunia, occasionally nausea and vomiting.

Signs.—Os rather patent, lips puffy, tenderness of cervix, tenacious discharge glairy, sometimes opaque.

Diagnosis.—See if disease is confined to the cervix, if uncomplicated with areolar hyperplasia; the uterine sound may be passed into the uterus, without the pain and bleeding that follows its introduction in endometritis.

Prognosis.—Favorable, but recovery slow.

Treatment.—Attend to general health, fresh air, light food; laxatives, tonics, injections of warm water with glycerin, or opium; dilatation of canal with tents; application of nitrate of silver, iodine (liquor), carbolic acid, tannin, acetate of lead, chromic acid, nitrate of mercury, nitric acid, actual cautery, scarification, or scraping the inflamed mucous membrane with a curette.—HEYWOOD SMITH.

ENDOMETRITIS.—*Definition.*—Inflammation of the mucous membrane of the body of the uterus. Rarer than endocervicitis.

Causes.—Scrofula, exhaustion, cold during menstruation, cervical endometritis, injury from the sound, tents, intrauterine stems, etc., tumors of the uterus, vaginitis.

Symptoms.—Leucorrhœa glairy, and sometimes bloodstained; disorders of menstruation, with occasional membranous dysmenorrhœa; pain in back, groins, and hypogastrium; headache, tympanites, nausea and vomiting, sterility.

Signs.—Uterus rather longer than natural, pain on the introduction of the sound, which is often followed by slight bleeding, tenderness on deep pressure, dilatation of internal os.

Diagnosis.—See Symptoms and Signs.

Prognosis.—Favorable if recent, if discharge is only mucus or blood, if there is no displacement, nor elongation of uterus nor constitutional nervous disorders, and the menopause is near. Unfavorable if chronic, discharge purulent, if dysmenorrhœa is membranous, much displacement, cavity elongated, vaginitis, menstruation active.

Treatment.—Very difficult of cure. Improve general health, good diet, and fresh air. Tonics, iron, quinine, acids; avoidance of intercourse. Tents, followed by iodine, zinc, the solid nitrate of silver, fuming nitric acid, or the pernitrate of mercury. The nitrate of silver should be applied with Lallemand's porte-caustique or Dr. Protheroe Smith's. To apply the nitric acid or nitrate of mercury: After the cavity has been slightly dilated it should be wiped out with a Playfair's probe and then another soaked in the caustic is carried up into the cavity and retained a few seconds, care being taken to prevent any superfluous fluid running out on to the vagina by the use of a pond of neutralizing fluid. (See Treatment of Areolar Hyperplasia of Cervix.) Atthill's intrauterine speculum may be used. Intrauterine injections are hazardous, unless in the hands of a skilled operator, but with due precautions for the ready escape of the fluid they may prove useful: such as iodine, carbolic acid, nitrate of silver, sulphate of zinc and copper, or iron (?). Scarification to be sparingly and carefully employed.—HEYWOOD SMITH,

ENDOMETRITIS, Cervical—*See Endocervicitis.*

ENTERALGIA—*See Colic.*

ENTERIC FEVER.—*Definition.*—Enteric or typhoid fever is an acute infectious disease characterized by swelling and subsequent ulceration of the Peyer's and solitary glands of the ileum, usually accompanied by successive crops of rose-colored papules, chiefly on the abdomen, together with abdominal symptoms and considerable constitutional disturbance.

Symptoms.—From ten to sixteen days after the reception of the poison, headache, chilliness, and occasional shivering, followed by a little delirium, are experienced. With these symptoms there is increased temperature, a furred tongue, and sometimes diarrhœa, or more often irregularity of the bowels, a few days of constipation being followed by purging. On the seventh, or from that to the twelfth day, in cases where a rash is present, a crop of rose-colored papules, from half a line to two lines in diameter, make their appearance on the abdomen, chest, and back. These are slightly elevated and disappear on pressure, but reappear the moment the finger is removed. Their number varies from two or three to a hundred or so, but usually not more than about half a dozen are present at a time. Each crop lasts from three to six days, and is usually followed by subsequent crops. When the papules fade, no discoloration of the skin remains, and the rash is never permanent. The duration of the rash is from one to three weeks, but occasionally recurs at a later date if there is a relapse.

During the course of the disease the abdomen becomes prominent, and often tympanitic and tender on pressure, especially in the right iliac fossa, where it often produces gurgling.

The constitutional symptoms increase in severity after the first week, and sometimes the delirium is violent in character. The tongue becomes drier as the fever progresses, and towards the latter part of the second week is dry, very red and glazed. Diarrhœa becomes a more common symptom in the second week, and is sometimes very severe. The stools are liquid and of a yellow-ochre color. If allowed to stand, the more solid portion settles to the bottom, and is then found to consist of shreds of undigested food mixed with sloughs and debris from the ulcers in the intestines. Often they contain a little blood. In some cases severe hæmorrhage occurs from the ulcers, and the stool then consists almost wholly of blood.

At a later stage of the fever the ulceration of the intestinal glands occasionally extends through the peritoneum, and perforation of the intestines, with its accompaniments of extravasation into the peritoneal cavity and consequently peritonitis, results. The temperature in enteric fever is always increased during the first week; it rises higher and higher until a temperature of 104° Fahr. is frequently reached. The morning temperature is lower than the evening, and during the second and third week this is maintained. Later, however, usually in the third week, as the recovery begins, the difference between the morning and evening temperature is much more marked. Occasionally a sudden fall of temperature takes place, due usually to hæmorrhage from the bowel; but if any rise be observed it is due to some complication, often of the lung. The pulse is always increased in enteric fever, often 120 at night, but less frequent in the morning.

In the mild cases the patient begins to recover at the latter part of the second week, and in more severe cases at a later date. Convalescence is always slow. Among the complications are hæmorrhage from the intestine, perforation of intestine, peritonitis, and pneumonia.

Occasionally two or three days before the lenticular spots make their appearance they are preceded by a scarlet rash, which spreads over the whole body. It is a mere temporary hyperæmia, and fades on pressure.

In rare cases petechiæ and purpuric spots occur during the course of the fever; they are in no way associated with the lenticular spots.

Taches bleuâtres are sometimes observed. They consist of blue patches from two or three to eight lines in diameter, of irregular shape, usually separate, but sometimes coalescing. They are not raised, and give an appearance somewhat resembling the typhus spots, but they do not pass through the same changes as the latter. They are usually situated on the abdomen, thighs, and back.

Sudamina frequently occur, and are followed by desquamation.

Diagnosis.—The diagnosis of enteric fever is usually not a difficult matter. The high temperature, the prominent abdomen, the dry red tongue, the diarrhœa, and, when present, the lenticular spots, conclusively point out the disease. It can be recognized by the flushed cheeks, glistening eyes, and parched lips, which contrast strongly with the heavy, dull, leaden appearance of typhus, and by other symptoms, which are given in a tabular form under "Typhus Fever."

Prognosis.—Young children rarely die of enteric fever, but as age progresses mortality increases. A very high temperature which is not attended with morning remissions, much diarrhœa, hæmorrhage, tympanites, delirium of a violent character, much muscular tremor, are unfavorable indications. The amount of rash is not prognostic of a favorable or unfavorable termination.

Treatment.—Considerable care is necessary in the treatment of enteric fever. The patient should not be permitted to leave his bed until convalescence has well advanced, should be fed on fluids only, and should be given no vegetable food. The diarrhœa should be carefully controlled, and constipation treated by enemata.

For tympanitis, peritonitis, etc., opium is the best remedy. Hæmorrhage should be treated with astringents and ice. Finally it may be stated that antipyretic treatment, both by cold bathing and the administration of quinine, has proved very successful on the Continent and in England when it has been systematically carried out.—MALCOLM MORRIS.

ENTERITIS.—Inflammation of the bowels presents considerable varieties as to the coats which are involved, and as to the extent of the intestinal tract which is implicated, hence the clinical history of this disease is anything but uniform. The term enteritis has been used vaguely, and several distinct conditions have been included under it. It will be convenient briefly to consider in the present article all forms of disease in which the intestines generally, or any portion of them, are inflamed, apart from special affections, such as dysentery or typhoid fever.

Etiology.—The causes of intestinal inflammation are very similar to those which induce gastritis. Enteric catarrh or muco-enteritis is ordinarily due to some direct irritation of the mucous lining by food or other materials, or to a cold; it is also frequently associated with various exanthemata, and with dentition. Irritant poisons give rise to more severe inflammation. A very intense local form of enteritis follows obstruction of the bowels; this also sometimes results from ulceration, or from extension of peritonitis, and it is said to occur in rare instances idiopathically. The local variety named typhlitis or inflammation of the cæcum is generally due to the lodgment of hardened fæces or of foreign bodies in this part of the intestine, or in the appendix vermiformis, which often ultimately leads to ulceration and perforation. Duodenitis, followed by ulceration is peculiarly liable to be set up after burns and scalds. Chronic intestinal catarrh remains occasionally after an acute attack, but usually results from the repeated action of irritants, or the complaint is associated with ulceration, lardaceous disease, or other organic changes affecting the bowel.

Anatomical Characters.—In the milder forms of intestinal catarrh the appearances resemble those observed in catarrh or other mucous surfaces, and need no special description. The secretions are abundant and often very irritating, being sometimes mixed with blood. Superficial erosions or slight ulcerations are not uncommonly observed. Occasionally a croupous or membranous deposit is formed over the surface more or less extensively, which indicates greater intensity of the inflammatory process. Should this be very violent, implicating the entire thickness of the gut, the color is extremely deep red, sometimes purple or almost black, being accompanied with spots of extravasation; all the coats are thickened and softened, and generally infiltrated with serum, or occasionally with exudation or pus, while the intestinal contents are often mixed with blood. Gangrene occurs in some cases. The peritoneum may be involved by extension, exhibiting patches of lymph corresponding to the inflamed bowel.

In simple catarrh the entire mucous tract is frequently affected, the condition beginning above and extending throughout the intestines; it may, however, be limited. The more severe forms are usually confined to short portions of the bowel, which are generally much distended, particularly when the inflammation depends upon obstruction, the part beyond being contracted.

In typhlitis the cæcum or appendix vermiformis becomes much inflamed from local irritation, and this leads to ulceration and destruction of the coats, which is liable to end in rupture or perforation. The perforation may take place into the peritoneum, causing peritonitis, or into the surrounding cellular tissue, setting up inflammation in this structure,—perityphlitis,—which usually terminates in the formation of an abscess, and this, if not opened, may burst in a variety of directions. Possibly perityphlitis may be excited independently of any actual perforation. The cause of the irritation is usually some foreign body or hardened fæces. In the appendix some small foreign substance which has gained an entrance becomes a nucleus upon which fæces and secretions are deposited, forming concretions which come to resemble fruit-stones, for which they have been frequently mistaken. Of course it must be remembered that perforation may result from other forms of ulceration which are met with in the cæcum, from mere distension of this part of the intestine, or from its destruction by some extrinsic growth. The same course of events is now and then observed on the opposite side of the abdomen, in connection with the sigmoid flexure. A localized variety of inflammation has also been described in the colon,—colitis,—supposed to be distinct from dysentery, beginning in the submucous tissue, but soon causing extensive destruction of the mucous membrane.

When intestinal catarrh becomes chronic, there are the usual changes in color, this being often dark or even black from pigment; thickening and induration of tissues, with degenerative changes in the gland structures. Chronic catarrh may give rise to ulceration, or, on the other hand, it may result from this condition, or from some other organic change in the bowel.

Symptoms.—1. Cases of simple enteric catarrh are generally characterized by uneasiness over the abdomen, with colicky and griping pains, especially about the umbilicus, where there may be a little tenderness, though pressure sometimes gives relief; formation of much gas in the intestines, causing gurgling and borborygmi; and diarrhœa, especially after taking any food or drink, the stools becoming in some cases very numerous, being at first feculent, but soon assuming a watery, irritating character. These may be the only symptoms, but as the stomach is often implicated at the same time, this is indicated by a red, furred, and dryish tongue, impaired appetite, thirst, and a tendency to nausea or vomiting. In duodenal catarrh jaundice is frequently observed, owing to the closure of the common bile-duct by the swollen membrane, and if the duodenum is solely involved there is corresponding localized pain and tenderness, with constipation instead of diarrhœa. Occipital headache is also said to be common in duodenitis. If diarrhœa has been severe for any length of time, the stools are apt to become somewhat dysenteric in character, containing mucus and blood, especially if the large intestines are mainly implicated, when there may also be much tenesmus and straining during defecation.

The symptoms are more marked in proportion to the intensity of the inflammation, especially the pain and tenderness, and they are particularly severe in connection with irritant poisoning. Should there be any membranous deposit upon the mucous surface, shreds, larger patches, or even intestinal casts of this material may be expelled in the stools.

General symptoms are in some cases entirely absent except, perhaps, some feeling of exhaustion from excessive diarrhœa. In the more severe forms of enteritis, however, pyrexia is observed, with languor, general pression, and headache. In children there is frequently high fever, accompanied with much prostration, a greatly distended abdomen, and aphthous stomatitis. Sometimes convulsions or coma set in, and death may result from this cause, or from exhaustion. In cases of irritant poisoning the general symptoms are grave, there being often a tendency to collapse, and the same thing is occasionally observed in severe enteric catarrh from other causes, especially in persons constitutionally weak, or who are the subjects of some chronic lowering disease.

2. The limited intense form of inflammation which involves all the intestinal coats presents symptoms essentially different from those just described, and it is to this variety that many authors limit the term enteritis. Here the affected portion of the intestine, which is at first the seat of spasm, soon becomes paralyzed, so that the contents cannot pass along, but accumulate in the part above. The early symptoms include much localized pain, with tenderness, often referred to the umbilical region, and increased by movement; general colicky pains and tormina, obstinate constipation, constant nausea and vomiting, thirst, a furred tongue, and pyrexia preceded by rigors, the patient presenting a distressed and anxious expression. In a short time, if there is no relief, the abdomen swells on account of tympanitis, while the painful sensations subside more or less, in some cases completely ceasing; the vomiting gradually becomes stercoraceous, at last the materials coming up without any effort; the tongue assumes adynamic characters; and signs of collapse set in, with a pinched countenance, and an extremely feeble and irregular pulse, the brain being either unaffected to the last, or death being preceded by low nervous symptoms. The urine becomes much diminished or suppressed. Hiccough is often a distressing symptom.

3. Typhlitis is generally indicated at the outset by pain and tenderness in the right iliac fossa, often severe, with, in some instances, distinct physical signs of an accumulation in the cæcum, and constipation, which may be followed by mucous or muco-purulent diarrhœa. Sudden perforation may take place into the peritoneum, even when there have been no previous symptoms of any moment. In other cases perityphlitis is set up, as evidenced by local redness, a firm swelling, œdema of the skin, increase of pain and tenderness, rigors and pyrexia, followed usually by signs of the formation of an abscess, which may open in various directions, either externally or internally, sometimes thus setting up peritonitis. The pus has often a fecal odor, and may be mixed with actual fæces or intestinal gas. If the case does not prove speedily fatal, a permanent fistulous opening may remain, death occurring gradually, preceded by hectic symptoms, or ultimately recovery may ensue, the abscess healing up. The same symptoms are observed in rare instances in the left iliac fossa, in connection with the sigmoid flexure.

4. Chronic intestinal catarrh is frequently attended with no other symptom than chronic diarrhœa, the stools being liquid, pale, fermented, and often very offensive or lienteric, varying much in number and quantity. In many cases uneasy griping sensations and gurgling are experienced from time to time, or there may be some degree of soreness over the abdomen. Gastric symptoms are generally present, and the tongue often presents abnormal characters. Owing to interference with digestion and nutrition, more or less wasting is commonly observed, as well as slight pyrexia in some cases, especially towards evening.

Diagnosis.—The chief affections for which the various forms of acute intestinal inflammation are liable to be mistaken are simple diarrhœa, or diseases attended with this symptom, especially typhoid fever and dysentery, intestinal colic, peritonitis, painful affections of the abdominal walls or, in the case of typhlitis and its consequences, local inflammation or an abscess in the right iliac fossa due to other causes, and certain tumors.

There can be no doubt but that many ordinary cases of diarrhœa are the result of enteric catarrh, and it is often impossible to separate them. The characteristic symptoms of typhoid fever and dysentery are usually sufficiently distinctive. Simple colic is recognized by the characters of the pain, the absence of fever, and the presence of constipation. Peritonitis is readily separated from mere catarrhal inflammation by the intensity of the pain and tenderness, constipation, great constitutional disturbance, and other symptoms; but as regards severe localized enteritis, it is by no means easy to distinguish between the two diseases. Indeed, in most instances, the peritoneum is involved along with the other intestinal coats, and this is more evident if the pain and tenderness are marked, superficial and extensive. Colicky pains are suggestive of inflammation of the more internal portion of the wall of the bowel. It is important to bear in mind duodenal catarrh as a not uncommon cause of jaundice.

In cases of chronic intestinal catarrh the main point to be determined is whether this is of a simple nature, or if it is associated with ulceration or amyloid degeneration. The special characters of intestinal ulceration will be presently indicated. Lardaceous disease of the bowels is almost always preceded by distinct clinical evidences of other organs being affected, as well as by one of the known causes of and the constitutional condition accompanying this morbid state.

Prognosis.—Ordinary enteric catarrh usually ends favorably, but it may become chronic. If intense, however, or if it occurs in children, in very weak subjects, or as a complication of acute or chronic diseases, it may become highly dangerous and end fatally. The severe form of enteritis is extremely grave. Typhlitis is also necessarily attended with many dangers. Chronic catarrh, especially if long established, is often very difficult to cure, and may itself ultimately prove fatal, while it adds to the gravity of other chronic diseases by interfering with the nutrition of the patient.

Treatment.—The remarks made with respect to diet in the case of stomach disorders apply with almost equal force to those affecting the intestines. In acute catarrh of the bowels if there is anything causing irritation, it is desirable to get rid of this by means of a dose of tincture of rhubarb, castor oil, or some other simple aperient, or by an enema. As regards internal remedies, the most serviceable combination in my experience consists of bismuth, with alkalies, and small doses of tincture of opium. An enema containing laudanum is also very useful after all irritant matters have been evacuated, and the various other remedies recommended for diarrhœa may be had recourse to if required. In duodenal catarrh it is necessary to give small doses of some saline aperient such as sulphate with carbonate of magnesia, which may be preceded by a dose of calomel. External applications over the abdomen, especially heat and moisture, are often beneficial. Ordinarily there is certainly no necessity for removal of blood, but in the early stage of the more serious forms of inflammation it may be permissible to apply a few leeches to the abdomen, provided the patient is in a fit condition. When the inflammation is accompanied with obstruction, the main points in treatment are to avoid giving purgatives, to adminster opium freely, either by the mouth, enema, or subcutaneous injection of morphia, to support the patient, especially by enemata, and to treat the prominent symptoms, particularly pain, nausea, vomiting, and tympanites.

Typhlitis and its consequences need constant fomentation and poulticing, perhaps the application of a few leeehes in some cases, and the administration of opium internally. If an abscess forms, it should be encouraged towards the surface, and the pus evacuated when the proper time arrives.

If an accumulation can be felt in the cæcum, it may sometimes be squee out by gentle manipulation, but much care is necessary in practicing th measure.

Chronic enteritis will probably require some of the more powerf astringents alluded to under diarrhœa. Powders containing carbonate of bismuth, gr. v-xx, with Dover's powder, gr. iij-vj, act very beneficially in some cases. Tincture of steel is also a valuable drug in this complaint, when given in full doses—mxx-xxx. In obstinate cases counter irritation over some part of the abdomen, especially over the right iliac fossa, by means of blisters, tincture of iodine, or croton-oil liniment, may prove of service.—FREDERICK T. ROBERTS.

ENTEROCELE.—*Definition.*—Entero-vaginal hernia; descent of a portion of the small intestines into the pelvis so as to cause a bulging in the vagina. This occurs usually in the recto-vaginal pouch.

Causes.—Straining during labor.

Symptoms.—Pain, with sense of fulness in vagina.

Signs.—Swelling detected in vagina, tense, elastic, but not giving the sensation of fluid.

Diagnosis.—It is very important to exclude other forms of swelling, as hæmatocele, pelvic deposit dislocated ovary, etc. The peculiar feeling of an air-sac may be sufficient to the practiced touch, but in cases of difficulty a fine aspirator will set the matter at rest.

Prognosis.—Unsatisfactory.

Treatment.—Reduction. The patient should be placed in the knee-shoulder position, and the hernia pressed up. After-treatment: perfect rest, opium, astringent vaginal injections or pessaries.—HEYWOOD SMITH.

ENTROPION—*See Eyelids, Diseases of.*

EPHELIS AND LENTIGO—*See Freckles.*

EPHEMERA, Puerperal—*See Puerperal Ephemera.*

EPIDIDYMITIS—*See Testicle, Diseases of.*

EPILEPSY.—*Etiology and Pathology.*—Epilepsy is the name given to a group of cases characterized by fits of loss of consciousness with convulsive seizures. It cannot be properly regarded as a distinct disease, as the fits may occur under a variety of conditions, including the following: 1. In connection with various organic diseases of the brain or its membranes, for example, meningitis, hydrocephalus, tumor, embolism, softening or syphilitic disease. 2. As the result of morbid conditions of the skull, which lead to pressure upon or irritation of this organ, such as exostosis, a fracture with projecting spiculæ of bone or necrosis. 3. From disorders of the cerebral circulation, leading to congestion or anæmia. 4. In certain forms of blood poisoning, for example, uræmia and saturnism. 5. As a so-called functional affection, to which some writers especially apply the term epilepsy. In cases belonging to this group, although organic changes have been described in the brain and meninges, these are commonly absent, and when present they are probably the effects of repeated fits, rather than the cause of the epileptic phenomena. One view as to the nature of this functional variety of epilepsy is that it depends upon some nutritive change in the medulla oblongata, upper part of the cord, and vasomotor centres, which leads to excessive and perverted action in these parts, inducing sudden contraction of the vessels of the brain and cord, as well as of those supplying the muscles of the face, pharynx, larynx, respiratory apparatus, and limbs, to which all the subsequent phenomena of the fit may be traced. According to another theory a sudden discharge of nerve force takes place from an immense number of nerve-cells at the beginning of a fit, which leads to shock, and the convulsions, like other forms of this disorder, are the result of a "discharging lesion." The remote causes to which epilepsy, which is independent of some obvious local cause, has been attributed are: 1. Mental disturbance, especially emotional, for example, a sudden fright, prolonged grief or anxiety; and also excessive mental work, or undue forcing of the brain in childhood. 2. Physical influences affecting the brain, as a blow or fall on the head, or sunstroke. 3. Certain conditions affecting the state of the blood and general system, and thus influencing the nutrition of the brain, such as syphilis, rheumatism, gout, acute specific diseases, pneumonia, pregnancy. 4. Reflex irritation, as from dentition, worms, uterine and ovarian disturbances, sexual excesses, or masturbation. Great prominence has been given by some writers to the sexual functions as a cause of epilepsy. 5. Hereditary taint. Undoubtedly this has an important influence in the causation of epilepsy, especially when it comes from the mother's side. In a considerable proportion of cases either epilepsy or some allied neurosis is prevalent in the family. Probably intemperance in the parents, syphilis, or a fright to the mother while the child is in utero, may be the means of inducing a congenital tendency to epilepsy. The complaint is developed at an earlier age in hereditary cases. 6. Idiopathic. This term applies to cases in which no obvious cause can be made out. Age requires special notice as a predisposing cause of epilepsy. In the great majority of cases the disease is developed between ten and twenty years of age, and especially at or about the period of puberty. Sex does not seem to have any particular influence in young persons, but it is said that in persons of somewhat advanced age the proportion of cases of epilepsy is greater in women. It rarely happens that any immediate exciting cause of a fit can be made out.

Symptoms.—Attacks of epilepsy assume one of two forms, of each of which it will be necessary to describe the typical characters.

1. EPILEPSIA MITIOR.—*Petit Mal.*—This form is characterized by sudden and complete loss of consciousness, coming on without any warning and lasting only for an instant, or at most for a few seconds, accompanied with slight pallor and subsequent duskiness of the face; loss of all expression; dilated pupils; and often, but not always, slight spasmodic movements affecting the face, respiratory muscles, or limbs. If the individual is speaking he stops in the middle of a sentence and generally appears to hold his breath. Voluntary movements cease, but automatic actions go on as a rule, such as those which are necessary for standing, sitting or riding. In some cases there is not absolute unconsciousness, and there may be but a feeling of sudden vertigo—vertige epileptique—which causes the patient to cling to the nearest object. After the attack there is some degree of mental confusion, lasting but a few minutes, during which the patient says and does things which he afterwards forgets and denies. Slight squinting may be noticed, or a feeling of choking may be experienced. On recovery there is no recollection of what has happened. These attacks may be preceded by an aura epileptica, and they may be premonitory of severe epileptic seizures, or both forms may occur in the same subject. They are frequently followed by serious mental changes, ending in dementia or mania.

2. EPILEPSIA GRAVIOR—*Haut Mal*—The advent of a fit of epilepsy is in a large proportion of cases indicated by premonitory symptoms, varying in duration from an instant to several hours or days. They present great variety, being either subjective or objective, and commonly of a nervous character, affecting the mental condition; general sensation or the special senses; the muscular system; or the vasomotor nerves. Sometimes they are extrinsic, such as vomiting, obstinate constipation, sallowness of the skin, or fetid secretions. The so-called aura epileptica requires a few words of special comment. This is a peculiar sensation, well known to the *patient, which in many cases immediately* precedes a fit, generally appear-

ing to start from the distal end of a limb, especially the arm, and to run up towards the head, on reaching which part the seizure takes place. Sometimes it only extends from the elbow to the shoulder, or from the leg to the epigastrium, and has been stated to pass from the testicle or uterus to the throat. The sensation varies in its exact character, but has been compared to a stream of cold or hot air, and is frequently not unpleasant. It is curious that its ascent may sometimes be stopped, and the fit prevented by pressure above where the sensation starts from, which need not be so powerful as to stop the circulation, and sometimes this will happen when the pressure is applied to the opposite arm.

Actual Attack.—Three marked changes characterize an epileptic fit:

Stage I.—The phenomena of this stage are a single, peculiarly disagreeable cry, yell, or moan, in many cases, but not in all, immediately followed by absolute and instantaneous loss of consciousness, the patient falling anywhere, or often appearing to be thrown down; a violent tonic spasm of the muscles throughout the body, beginning generally about the face and neck, the whole muscular system being in a state of extreme rigidity and strain, but not equally so, and hence there is a hideous distortion of the features, limbs, and body, the latter being drawn to one side, and the neck twisted so that the face looks over one shoulder, while the teeth are firmly clenched, the eyes wide open, and the eyeballs turned up or in; stoppage of respiration, usually complete, owing to the spasm of the muscles; change in color of the face almost invariably, in many cases deadly pallor being observed at first, followed by duskiness or lividity, or this may be present from the commencement, or be preceded by florid or dull redness; marked dilatation of the pupils; and feebleness or cessation of the pulse at the wrist, due to the muscular spasm, for the heart acts forcibly and the carotids throb violently. Practically these phenomena may be considered as simultaneous, the whole stage not lasting longer than from two or three to thirty or forty seconds.

Stage II.—The transition to this stage is abrupt, and is indicated by restoration of breathing, the respiratory muscles becoming relaxed, and the retained air being expelled. Unconsciousness continues, but severe clonic spasms take the place of the tonic rigidity, usually beginning with twitchings about the face or sometimes in the limbs, but soon extending more or less over the whole body, though often more violent on one side than the other. From these spasms originate the phenomena of this stage, viz., hideous distortion and convulsive movements of the features and eyeballs; forcible closure and champing of the jaws, causing grating of the teeth, foaming at the mouth, partly due to formation of excess of secretion, which is blown out of the mouth, and biting of the tongue or cheek, the froth being therefore often bloody; violent convulsive movements of the body and limbs, which are thrown about and twisted in all directions, the fingers being generally bent and the thumb passed into the palm; alternate dilatation and contraction of the pupils; labored, panting, and irregularly convulsive respiratory movements, often attended with gurgling sounds due to mucus in the trachea; increasing duskiness or lividity and turgidity of the face, tongue, and body generally, with distension of the veins, some of the smaller vessels sometimes giving way, thus giving rise to extensive petechiæ about the face or head; profuse perspirations, the sweat being sometimes peculiarly fetid; tumultuous action of the heart, with throbbing of the large arteries, though the radial pulse is often weak; involuntary discharge of urine, fæces, or semen; and frequently rumbling noises in the intestines, vomiting or hiccough. The average duration is said to be from 4½ to 5½ minutes, but it may vary from a few seconds to 10 minutes. The clonic spasms are believed to be the result of the stoppage of respiration in the previous stage, with consequent asphyxia.

Stage III.—There is a gradual return to consciousness, with cessation of the spasmodic movements. The patient looks around with a bewildered, alarmed, or sad expression, and often attempts to get up or to speak, but some few minutes usually elapse before consciousness is completely restored. The heart still acts vigorously, and the skin is bathed in sweat. Vomiting often takes place. A large quantity of pale and watery urine may be passed, containing excess of urea and urates, or sometimes abundant phosphates, and it is said that a trace of sugar has been found after a severe epileptic fit. After return to consciousness the patient feels usually very exhausted and sleepy, as well as mentally confused, and complains of headache. In many cases, but by no means in all, he falls into a state of heavy sleep or stupor, almost amounting to coma, attended with a stertorous noise in breathing, from which it is difficult or impossible to rouse him, and which lasts for a variable time, sometimes passing into natural sleep. The muscles are relaxed, but present occasional twitchings or slight spasmodic movements. The face generally remains more or less dusky for some time, and the petechiæ continue visible. The patient is often languid and out of sorts for some days after a fit.

The frequency and severity of the fits vary much in different cases. In a good many a tolerably marked periodicity is observed. In few instances does the interval extend beyond the month. The seizures are more frequent as a rule in severe cases, and they tend to increase in frequency and intensity as the disease advances. Not uncommonly two or more fits occur in succession, followed by a period of freedom from attacks. They are liable to come on by night as well as by day, and nocturnal fits of epilepsy may occur without the patient being in the least aware that they have taken place.

The general state of the patient also differs considerably. There is rarely perfect health, especially after epilepsy has existed for some time. Many epileptic patients suffer from headache or giddiness and various other symptoms, the general system and digestive organs being also out of condition. The mental faculties become more or less weakened in most cases, and this may end in complete dementia or dangerous epileptic insanity. Sometimes partial and limited paralysis, twitchings, curious movements, disorders affecting sensation or the special senses, and other nervous phenomena are observed. As complications of epileptic fits, coma resulting from injury to the head, apoplexy, or meningitis may arise.

Diagnosis.—The chief conditions from which idiopathic epilepsy may have to be distinguished are hysteria; reflex convulsions; epileptiform attacks due to cerebral organic diseases, uræmia, or chronic alcoholism; syncope, and feigned epilepsy. Some of these will be alluded to in future chapters. With regard to hysteria, a condition named hystero-epilepsy is now recognized, which presents a combination of the phenomena of both diseases. Attacks of petit mal have to be distinguished from fits of syncope, and from vertiginous attacks in cases of Meniére's disease.

Prognosis.—A cautious opinion should always be given in cases of epilepsy as to the final issue. Very rarely does a fit end fatally, but this might happen in consequence of some complication. As to the curability or improvement of the disease, the favorable prognostic circumstances are its being recent or due to some definite cause which can be removed, the patient being very young and a male, absence of hereditary taint, the mind being unaffected, and the fits being of frequent occurrence. Inherited epilepsy is very rarely cured; and if the attacks have begun in early childhood from some reflex irritation, and have lasted many years, the prognosis is also very unfavorable. The mental faculties are more liable to become affected in females; in persons who are strong and healthy, when the disease begins late in life; when the fits occur in rapid succession, with attacks of "petit mal;" and, it is said, when the spasms are not marked during the fit, and there is little or no subsequent coma.

Treatment.—During a Fit.—It is best not to interfere actively during an epileptic seizure in most cases, merely attending to the matters mentioned when speaking of convulsions in general, preventing injury, but not holding the patient forcibly, and putting something between the teeth. If the fit does not soon cease, water may be dashed over the face and chest, and should it become dangerously prolonged, such measures might be had recourse to as the application of sinapisms to various parts; a warm bath, with cold affusion while the patient is in it; ice to the spine or head; stimulant enemata; electricity, local removal of the blood from about the head; or even venesection should there be great danger of asphyxia. After a fit the patient should be placed in a comfortable position, kept quiet and allowed to sleep.

2. *In the Intervals.*—There are certain well-defined principles to be followed in the management of an epileptic patient. *a.* It is requisite to look for and remove any obvious cause of epilepsy. Thus, should there be any local cause of irritation, such as a foreign body irritating a nerve, or worms, this must be got rid of. Further, as epilepsy may depend on some central organic mischief, careful investigation is required in order, if possible, to find out and treat any such disease, especially if due to syphilis, when iodide of potassium is of the greatest service. Any constitutional condition, as rickets or tuberculosis, must be attended to. *b.* The general management of an epileptic patient is highly important. He should have a nutritious, but light and digestible diet; take moderate daily exercise in the open air; be surrounded by proper hygienic conditions; avoid much mental work, especially in the case of children, who should be kept from school, though if the general health is good, older patients may follow some light occupation; have cold or tepid sponging daily, with friction afterwards; check any vicious habit, such as excessive venery, masturbation, or intemperance, and take a sufficient amount of sleep, the head being well raised in bed. It is necessary to regulate the digestive functions, especially avoiding constipation, but only mild aperients should be used. Iron, if there is anæmia, quinine, strychnine, arsenic, and other nervine or other tonics are often of service. Cod-liver oil is also frequently of much value. Many epileptics require constant watching, and all need more or less supervision; above all they must not be allowed to go into positions where they would be in danger from falling, or near a fire or water. Epileptic patients decidedly ought not to marry.

3 *Specific Treatment.*—Innumerable specifics have been brought forward for the cure of epilepsy. Of these the only drugs that deserve special mention are bromides, especially bromide of potassium and ammonium; belladonna or atropia; stramonium; conium; extract or tincture of cannabis indica; preparations of zinc, especially the oxide, the sulphate in gradually increasing doses up to 10, 15, 20, or more grains thrice daily, the valerianate, the acetate, and the bromide; ammonio-sulphate of copper; nitrate of silver in minute doses; opium in small quantities, and chloroform by inhalation, not in sufficient quantity to induce complete insensibility, either systematically employed at certain intervals daily, or only administered when there are signs of an impending fit. Nitrite of amyl has been recently recommended. Doubtless all these agents prove serviceable in different cases, and sometimes they may be usefully combined, as, for example, belladonna with sulphate of zinc. Bromide of potassium has been found eminently beneficial when given in doses of gr. v-xxx or more, thrice daily on an empty stomach. It almost always lessens the number of fits, often keeps them off entirely, though the dose has generally to be gradually increased in order to accomplish this end, and sometimes

a complete cure is effected by its use. The bromide is found to be particularly useful when the attacks are chiefly or entirely of the "haut mal" type, when they are very frequent, and when they occur mainly by day. Brown-Séquard recommends a combination of bromide of potassium and ammonium. Dr. Chapman treats epilepsy by the constant application of ice to the spine, and in some instances this seems to be useful. In obstinate and dangerous cases local removal of blood from the back of the neck, followed by counter-irritation by means of blisters, the actual cautery, setons, or issues, either over this region or between the scapulæ, has been recommended. In very severe cases it has also been advocated to shave the head and apply croton oil liniment. When there is an aura starting from limb, finger, or toe, a circular blister applied around the part may prove highly useful. The treatment of epilepsy by clitoridectomy, castration, circumcision, and such methods need only be mentioned to be condemned. Trephining the skull has been resorted to in some dangerous cases with advantage.

4. *Prevention of Fits.*—Some authorities attach considerable importance to the prevention of the fits in the curative treatment of epilepsy, by attending to warnings, and thus endeavoring to make the attacks abortive, and to prevent the changes in the nerve-centres which increase the tendency to other attacks. The measures to be adopted depend upon the nature of the premonitory symptoms. Thus, if a sensory aura is felt in a limb, a handkerchief or band should be applied tightly around this part rapidly, and several times in succession. A case was under my notice for a considerable time in which the aura started from the thumb, and the patient used to prevent fits after a severe struggle by drawing a handkerchief tightly round the wrist. Brown-Sequard has shown that the fits may be averted by applying the ligature round another limb, as well as by pinching or striking the skin, or irritating its nerves by heat, cold, galvanism, or repeated pricks with a needle. If an involuntary muscular contraction precedes loss of consciousness, it is recommended to draw forcibly on the contracted limbs, so as to elongate them; or a blow, pressure, or friction upon parts where some muscles become rigid may have an equally good effect. In cases where disorders of breathing, or laryngismus, occur at the outset, the use of ether or chloroform as an anæsthetic is recommended. In connection with laryngismus, Brown-Séquard has found cauterization of the fauces with a strong solution of nitrate of silver very efficacious. Among other preventive measures available in different cases this authority mentions the administration of an emetic, purgative, or stimulant; a full dose of chloral hydrate; subcutaneous injection of atropia or morphia; the immersion of the hands in hot water, inhalation of nitrite of amyl; rapid and ample respiratory movements for five or six minutes; jumping or running, and reading very fast.—FREDERICK T. ROBERTS.

EPIPHORA—*See Lachrymal Apparatus, Diseases of*

EPISPADIAS—*See Penis, Diseases of.*

EPISTAXIS—Bleeding from the nose.

Causes.—Congestion of mucous membrane of nose; this may result from catarrh, from a varicose condition of the nasal veins, the result of old catarrh, from congestion of the liver, from heart-disease, and even from dyspepsia. Childhood and puberty are the usual ages, but middle life (from liver, heart, or kidney disease, &c.,) is also subject. Epistaxis in old age sometimes appears to result from weakness, which it of course aggravates. Blows; hæmorrhagic diathesis; vicarious menstruation.

Prognosis.—Dangerous in old and weakly people.

Treatment.—Perfect rest, coolness, but extremities should be warm; bathing face with hot water to diminish congestion of mucous membrane;

sometimes cold water acts better; raising hands above head; head not to be held down over a basin; injections of cold water, of hot water (temperature 100°) of tinct. ferri perchlor., pure or diluted; these injections may be given by a syringe which directs the current backward. Ice to the back of the head; cold to the spine; dry cupping between shoulders; plugging; plugging posterior nares.

Operation.—A pice of whip-cord is passed through the nose into the pharynx by means either of Bellocq's sound or of an elastic catheter. It is then pulled from the pharynx into the mouth by forceps, and a plug of compressed sponge or lint tied to that part of the string hanging out of the mouth, but some distance from its end. Plug should be small and nicely shaped, or part of it will irritate the back of pharynx or even top of larynx. Now pull the string back through the nose and guide the plug into the posterior nares. Nasal and oral ends of string should be tied together and fixed on face with strapping. When removed plug is to be pulled back through mouth. But string should not be taken away till danger of recurrence seems to be gone.—C. B. Keetley.

EPITHELIOMA—*See Cancer.*

EPULIS.—A term applied to fibrous, sarcomatous, and cancerous tumors of the gums. Most are fibro-myeloid; the less of the myeloid structure, the more innocent the growth.

Symptoms.—Non-cancerous epulis; a fleshy, red tumor of the gum; teeth loosened, and pushed forward; size variable; sometimes ulceration. Cancerous epulis has the special marks of malignancy, rapid growth, excavated ulcer, etc.,

Prognosis.—Neither fibrous nor myeloid epulis usually returns if the bone from which it springs be removed.

Treatment.—Removal of tumor and attached alveoli with cutting pliers—and small saw.—C. B. Keetley.

EQUINIA—*See Glanders.*

EQUINIA MITIS.—*Natural History.*—A pustular eruption, produced by the contagion of matter from a horse affected with " the grease," is characteristic of this disease. Grease in horses is a specific inflammation of the sebaceous glands of the skin in or about the heels. There is first a catarrh from these glands, and the secretion which flows gives forth a very loathsome smell. The catarrh gradually passes to ulceration, giving rise to unhealthy sores—deep, raw, and excessively tender cracks or fissures, with an offensive discharge.

The catarrhal discharge is the most virulent, and produces a pustular eruption on the skin of man very similar to ecthyma, elevated above the skin, and with a red, purple, tumid base, attended with febrile symptoms, with very marked depression and tremors, much foulness of tongue, rapid pulse, and alternate heats and chills. The eruption becomes pustular in about eight days—the pus being watery and abnormal. In ten or twelve days the eruptions die away, and scabs form, which, falling off, leaving well-defined scars.

Treatment.—Frequent purgation with aloes, combined with ammonia, and such moist local applications as tend to relieve pain, give the greatest relief to the constitutional symptoms. Tonics and stimulating treatment are required to aid convalescence.—William Aitken.

ERYSIPELAS.—A diffuse inflammation of the skin or subcutaneous areolar tissue, or of both together, almost always attacking the neighborhood of some wound. Three kinds, viz : 1, Simple ; 2, Cellulo-cutaneous ; 3, Diffuse cellulitis.

Causes.—Usually a wound which has been exposed to unhealthy influences, *e.g.*, septic virus, draughts of cold air, constant mechanical irritation, certain epidemic influences, contagion from an adjacent case of erysipelas or puerperal fever. Predisposing causes are bad ventilation, bad and insufficient food, dyspepsia, hospital air when impure, depressed nervous system, want of cleanliness, diabetes, kidney-disease, alcoholism, contact of atmospheric germs with a wound.

Signs.—Simple Erysipelas. At first, rigors, fever, sudden rise of temperature, sometimes to 104°, symptoms of disordered digestive organs, *e.g.*, furred tongue, constipation, or diarrhœa. In about twenty-four hours, sometimes later, a rosy redness appears on the tract of skin affected. Margins of redness either well or ill-defined. It disappears on pressure. Slight superficial swelling; when the face or head are affected there is often considerable œdema, especially of eyelids. Progress of fever is irregular, and depends on whether rash spreads or not. Recovery usually takes place in mild cases in a few days, in more severe cases in a week or so, and is followed by desquamation. Often the adjacent lymphatic glands enlarge before the erysipelas appears. The rash may spread all over body (erysipelas ambulans), or disappear in one place to reappear in another (erysipelas erraticum). These varieties are more serious. When there is a wound, it ceases to secrete healthy pus for a time. Pain is rarely severe.

2. Cellulo-cutaneous erysipelas (Phlegmonous erysipelas).—Constitutional symptoms are as in simple erysipelas, but more severe. Redness deeper. Swelling greater. Within a week the swelling becomes boggy, and next fluctuates, indicating suppuration. Throbbing pain and perhaps a slight subsidence of the symptoms may precede suppuration. Extensive sloughing usually occurs.

3. Diffuse Cellulitis is always preceded by a wound, especially a dissecting wound or the bite of some venomous animal. The skin is not much affected; but the subcutaneous cellular tissue presents the same œdema, swelling, hardness, bogginess, fluctuation, suppuration, and sloughing as are seen in phlegmonous erysipelas. The constitutional symptoms are severe and usually of an asthenic type. Danger of pyæmia.

Pathology.—All the above forms are related and are primarily inflammations of the lymphatics (lymphangitis), erysipelas simplex affecting only the cutaneous absorbents. In the boggy stage of cellulitis and phlegmonous erysipelas, the cellular tissue is distended with effusion, and parts of it are approaching a state of mortification. Sloughing and suppuration almost always follow. Great thickening and stiffness are often left after the deeper varieties of erysipelas.

Diagnosis.—Do not confound the redness and œdema over an abscess beneath deep fascia with erysipelas. Diagnose also from phlebitis.

Prognosis.—Bad when the habits are intemperate, kidney or liver diseased, age old or very young, cause epidemic, form erratic or recurrent, duration prolonged, or if very severe and occurring in the head and face (or neck especially).

Treatment.—Commence with purge (calomel gr. v-x) Salines. Tinct. ferri perchlor. (m. xx 4^{tis} horis). Diet nourishing but slight; avoid loading with more food than is digested. Stimulants recommended by most authorities. Moderate temperature, fresh air, but no draughts. Opium not well borne. Local treatment in simple erysipelas, cotton-wool, flour, zinc oxide, especially for erysipelas intertrigo, that is the form caused by two moist cutaneous surfaces rubbing against each other. Caustics, circumscribing rings of argent. nit. or tinct. iodi of very doubtful benefit. In the deeper varieties of erysipelas, fluctuating spots should be opened, and tense parts marked with small incisions (2 inches), before they fluctuate. Poultices. If incisions cause hæmorrhage, stuff with dry or oiled lint. At commencement of erysipelas in strong, otherwise healthy persons, with foul tongues, give an emetic. This sometimes aborts the attack. Elevate position of part affected.—C. B. KEETLEY.

ERYTHEMA. ERYTHEMATA.—*Definition.*—The erythemata are characterized by the existence on the skin of dusky-red, slightly raised patches of various sizes, which occasionally vesicate, run an acute course, and are attended with little or no constitutional disturbance.

Symptoms.—When the patches first appear, they are surrounded by a hyperæmic zone, which prevents their margin being clearly defined; at the end of a few hours this zone disappears without leaving any pigment, and the erythematous papules can be distinctly recognized. After lasting a few days the papules fade, and are usually followed by desquamation, which is limited to the site of the eruption. In some cases, during the height of eruption, a small vesicle or bulla may be produced. There is no itching, and but little, if any, constitutional disturbance. The papules are most frequently found on the back of the hands and the dorsum of the feet, where as a rule, they commence even when they extend to other parts of the body. They occur less often on the arms and legs, and seldom extend to the face and trunk of the body, never without implicating the limbs. A large number of varieties of this rash have been described by different writers, depending on differences noticeable in the character of the eruption itself, in its site, and in the amount of constitutional disturbance it produces.

With one exception, to be afterwards mentioned, they are attended by but little if any increase of temperature; indeed, but for the appearance of the rash there is nothing in the patient's condition, either local or constitutional, which would attract attention to the disease. They all agree in the rash being unilateral; when the trunk is implicated, both sides of the body are affected at the same time. The duration of the disease varies greatly, and it often has a tendency to return to parts which have been attacked in the first instance, and from which the eruption has already faded.

Erythema læve occurs as the result of venous obstruction, and is a mere hyperæmia of the skin; it frequently is a consequence of some general condition, such as dropsy, and is more often seen on the legs. The redness is preceded by œdema of the skin, and may not progress further than the stage of hyperæmia, but occasionally bullæ form on the surface.

Erythema fugax is a simple hyperæmia of the skin, which is due to gastric disturbance or local irritation. It consists of patches of redness of irregular shape, which appear in different parts of the body, frequently on the face and upper part of the trunk. The patches are of very short duration, come and go rapidly, and in most cases itch and tingle while present.

Although these diseases are usually described as erythemata, it is doubtful whether they should not, as Hebra suggests, be excluded on the ground that they are only hyperæmiæ of the skin.

Erythema intertrigo is a local erythema, produced by the friction of opposed surfaces of the skin, and occurs in fat persons, more particularly children. It soon becomes moist, when it assumes the nature of eczema, under which head it will be again noticed.

Of the other varieties described by different writers, such as Wilson, Rayer, and Fuchs, only those included by Hebra under the name of erythema multiforme will be noticed. Hebra looks upon these varieties as merely different stages of development of the same eruption; thus E. papulatum and E. tuberculatum differ from each other simply in the size of the patch, in the former being about the size of a pin's head or larger, in the latter about the size of a fourpenny piece. They occur generally on the backs of the hands and feet, and occasionally extend to the arms and legs, and rarely to the face and body. In both forms they are of a dusky-red or violet color, and when they first make their appearance are surrounded by a zone of redness, which lasts but a few hours. At the end of three or four days they fade, occasionally leaving a temporary yellow stain, due to escape of coloring matter of the blood into the skin. A slight desquamation follows the fading of the papules. The papules are succeeded by others, but the whole course of the eruption is limited to a few days. The young are most frequently affected by this form of erythema, most often in the spring and autumn of the year. A difference of opinion exists as to which sex is most frequently attacked.

Erythema annulare results when the erythematous patch begins to fade in its centre, leaving a red ring surrounding a pale surface.

Erythema iris is produced when a second or third ring is formed outside the inner, due to a fading of the redness in the circumference of the patch. In this, as in all varieties, vesication may take place.

Erythema gyratum is said to occur when portions of the rings of E. iris fade, and in consequence of several patches being close the rings run together, forming a serpentine eruption.

The circular form of erythema differs only from the papular in the appearance of the eruption. They present themselves on the same parts of the body, last but a few days,—never beyond a month,—and cause almost no constitutional disturbance.—MALCOLM MORRIS.

ERYTHEMA NODOSUM.—This variety of erythema differs widely from the preceding forms in the character of the eruption—in its site, in its symptoms—and, in fact, it is not a skin disease at all. It consists of oval swellings, at first hard, but at a later stage soft, from a half to four or five inches in length. At the commencement the swellings are pale red, but gradually become of a dark red or violet color. After a few days, as the color fades, it is replaced by a yellow discoloration, which persists for some time after the swelling. These swellings occur in crops of rarely less than a dozen in number, most frequently on the front of the lower extremities, but are by no means limited to this site. A second, sometimes even a third, crop makes its appearance, invading parts which in the first attack have escaped, and thus the eruption extends over other parts of the body. This form of erythema is not attended by any itching, but is characterized by considerable pain at the seat of eruption, and great general debility, anæmia, and gastric disturbance.

Diagnosis.—Simple erythema can only be confounded with prurigo, from which, however, it can be distinguished by the extreme itching and blood crusts of the latter, and by the limitation of the rash of prurigo to the back and extensor surfaces of the arms and legs; while erythema attacks the anterior surface as well. The varieties of erythema multiforme can hardly be mistaken for any other disease, with the exception, perhaps, of the gyrate form, which may be taken for ringworm of the body. The rapidity of the appearance and disappearance of the former, and the absence of microscopical evidence, are points to guide us in our diagnosis.

Erythema nodosum can be readily distinguished from all other eruptions by the tenderness of the patches, the pain they occasion, and by the constitutional and gastric symptoms which accompany it, as well as by the gradual alteration in color from day to day, resembling a bruise.

Prognosis.—Always favorable, although the period of duration varies. Death after E. læve results not from the erythema, but from the disease during which it occurs. The length of an attack of E. nodosum depends on the number of crops which appear; five or six weeks is, however, an outside limit. Like the rest of the erythemata, the symptoms disappear spontaneously.

Treatment—In the treatment of E. læve every care should be taken to assist the circulation of the part; the limb should be raised, carefully supported, and warm fomentations applied. Often acupuncture by means of Southey's trocars becomes necessary to relieve the œdema. Bathing the part with an astringent lotion is recommended.

In E. fugax the diet should be carefully regulated. Often this eruption is due to the use of soap, which should of course be avoided. Local treatment is unnecessary, not only in this form but in all the varieties of erythema, on account of the short duration of the eruption. In E. intertrigo attention should be paid to keeping the part dry and clean; a weak tar lotion is of use. The constitutional treatment of all the erythemata should consist in regulating the bowels and in the subsequent administration of acid and bitter tonics.—MALCOLM MORRIS.

EXANTHESIS ARTHROSIA
EXANTHESIS ROSEOLA ARTHRODYNIA } *See Dengue.*

EXCISION OF JOINTS.—The indications for excision and the conditions of success vary with each joint. Objects of excision may be: 1, to merely expedite recovery; 2, to restore motion to an ankylosed joint; or, 3, one of the various purposes for which amputation is done. Hence the choice often lies between excision and amputation.

COMPARISON OF EXCISION AND AMPUTATION.—Life is always to be considered before limb. Excision involves a larger wound and greater strain on the constitution; hence it is bad for tuberculous and cachectic people. Much depends on the particular joint. Excision safer than amputation at shoulder and hip. Danger equal for the two operations at the elbow; at knee excision is far more dangerous than amputation. At elbow and wrist excision is, of course, far preferable to amputation, because it leaves the hand. At knee, amputation is generally to be preferred, because of the great danger of excision. Excision of ankle is often a good operation; but, if the tarsal bones are diseased, there is great danger of recurrence, and removal of too much bone would leave too weak a foot. *Operation.*—Instruments—knives, forceps, lion forceps, saws (Butcher's saw, keyhole saw, chain-saw, etc.), chisels, cutting pliers, rasping instruments for scraping off periosteum, retractors, directors, excision-director. Esmarch's bandage generally to be used. The following six directions are abbreviated from Erichsen. 1, Make incisions sufficiently free, and parallel to important parts, so as not to divide them; 2, economize length of bone by use of gouge; 3, leave epiphysial cartilage in children; 4, don't open medullary canal in adults; 5, keep periosteum; 6, don't confound new bone or bone softened by inflammation, but otherwise healthy, with diseased bone, etc.

PROCESS OF REPAIR AFTER EXCISION.—This is entirely analogous to the process of repair after compound fractures.

SPECIAL EXCISIONS.

ANKLE-JOINT, EXCISION OF.—Disease should be limited to ends of leg-bones and to astragalus. *Operation.*—Incisions two, one internal, along edge of inner malleolus; the other, external, along posterior border of lower two inches of fibula, around outer malleolus and as far forward on outer side of foot as within one inch of base of fifth metatarsal bone. Saw and nip off inner malleolus through inner incision. Dissect soft parts sufficiently away, pulling peronei tendons backwards and downwards, and keeping close to bone to avoid posterior tibial artery. Cut off outer malleolus; push tibia out of external wound, and saw off its articular surface. Next remove part or whole of astragalus according to its condition. Dress the wound and place the limb on a firm splint. *Result.*—Generally good. Often a movable joint. Fatally 1 in 5 1–2, success greatest when disease is of traumatic origin.

Elbow, Excision of.—In this joint, excision, if practicable, always preferred to amputation. A matter of opinion whether in mere suppurative, synovial disease, the results of excision or of natural cure, are the best; but in necrosis excision should be done. *Operation.*—Use a strong knife and ordinary saw. Longitudinal incision 5 inches long, right down to bone, with its centre opposite inner border of olecranon. Then with scalpel separate soft parts from bones, proceeding carefully between olecranon and internal condyle, and guarding ulnar nerve with nail of left thumb. Divide lateral ligaments, push end of humerus out of wound and saw it off freely. Then project ulna and radius, grasp olecranon with lion forceps, and saw both bones at level of neck of radius. Sometimes orbicular ligament can be preserved with advantage. Some do whole operation subperiosteally with aid of rasps.. Subperiosteal resection of doubtful advantage. *Results.*—In good cases, a strong joint with all its natural movements. *After-treatment.*—Hinged splint. One contrived to permit supination and pronation useful. In a week's time, flex the elbow to a right angle. When wound is nearly healed use passive motions.

Hip-Joint, Excision of.—Indications for operation. See Disease of Hip-Joint and Gun-shot wounds. *Operation.*—Incision, free semi-lunar with convexity backwards over posterior border of great trochanter and down to bone. Follow neck of bone to head, open capsule, and let assistant, by adducting, rotating inwards and pushing upwards, project head of femur out of wound. Ligamentum teres may have to be divided. Joint very rarely found dislocated. If femur be diseased, saw below trochanter. Chain-saw useful. If acetabulum only be diseased, saw through neck of femur and gouge acetabulum, or cut it with pliers. Pelvic fascia thoroughly separates acetabulum from pelvis. Acetabular disease requires freer incisions. *After-treatment.*—Plaster apparatus; long splints with iron interruption; mere extension by weight and pulley; Sayre's wire breeches. In dressing the wound a stretcher with a hole opposite the hip, like that of Mr. Croft, is useful. For heavy adults a stretcher contrived to slip easily, piecemeal, under the patient, and to leave the hips exposed, is very useful. The stretcher being slipped under the patient, is lifted up and placed with its two ends on two chairs beside the bed. A dressing-pan being placed on the floor, the wound can be syringed if necessary, and dressed; while, in the mean time, the bed-sheets are changed or smoothed. *Prognosis.*—Many cases die, but probably not one-third of these perish actually from the operation. Without interference some of the successful cases would have perished of the original disease.

Knee, Excision of.—Indications. See Disease of Knee-Joint. Amputation almost always preferred for injury. *Operation.*—Nearly transverse incision below patella from back of one condyle to back of other, and dividing ligamentum patellæ. Throw up soft parts from patella and front of lower end of femur. Divide lateral ligaments on the condyles. Retract soft parts and project femur. Saw through condyles below the epiphysial cartilage in children. Proceed very carefully, both in separating soft parts from back of condyles and in making the last cuts with the saw, or popliteal artery may be wounded. Now push end of tibia upwards and forwards, and saw it off close to articular surface in case of children. Make saw-cuts through the two bones so to correspond that limb may be straight. If they do not fit in this way after first sections, other sections must be made. Carefully secure all the bleeding vessels. *After-treatment.*—Put apparatus on at once. Some fixed contrivance, like P. H. Watson's combination of anterior iron splint with paraffined or plaster of Paris'd bandage, the best. Iron back splint with foot-piece and interrupted side splint. Bavarian splint. Salter's swing. Packard's splint.*

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* See *Med. Rec.* 74, approved by F. H. Hamilton and L. A. Sayre.

Do not disturb limb for first few days. Recovery and repair are very slow, average eight months. Some surgeons leave patella. Ankylosis should be osseous. An outward bend of the limb is a common misfortune after this excision.

Excision of Os Calcis.—Lines of incision : 1. Along upper border of os calcis from inner side of tendo Achillis to a little in front of calcaneo-cuboid articulation ; this should divide the tendo Achillis. 2. Across sole of foot, from anterior end of first incision. Disarticulate from cuboid first, and from astragalus afterwards. Beware of wounding posterior tibial vessels. A very useful foot results. Prognosis is excellent.

Excision of Scapula.—Done for necrosis, caries, and morbid growth. Partial or entire. Crucial or T-shaped incision. Hæmorrhage occasionally very serious. In removing the entire bone, divide the muscles attached to posterior border at an early stage of the operation, and leave the subscapular vessels till last. Tie the vessels as the operation proceeds. *Prognosis.*—Danger not so great as might be expected.

Excision of Shoulder.—Done for gunshot wounds and compound dislocations, and occasionally may be justifiable in cases of bone-disease or innocent tumor. But, in cases of bone-disease, the cure by natural ankylosis affords a perfectly satisfactory result, which is not improved upon by excision. *Operation.*—Incision. Longitudinal form just outside coracoid process downwards and outwards for five inches, right down to bone. Open capsule and divide muscles attached to tubercles of humerus, rotating outwards while cutting internal rotator (sub-scapularis), and *vice versa.* Arm should at same time be brought across chest. Pull tendon of biceps aside. Operator himself now seizes upper arm in his left hand and pushes head of humerus out of wound. Clean soft parts from line of saw-cut. Saw. If, upon opening the joint, amputation is judged expedient, make a circular incision at the lower end of the longitudinal one, and disarticulate. Excision may be performed with a flap incision, raising the deltoid. Glenoid cavity rarely removed. *Prognosis.*—Very good. Useful limb. Fatality : of fifty cases, in seventeen the glenoid cavity was interfered with, and in thirty-three the head of the humerus only was touched ; of the seventeen, seven died ; of the thirty-three, only one died. But in military surgery, one in four died.

Excision of Tarsal Bones.—See Excision of Os Calcis, above. Excision of these bones for disease requires a little knowledge of anatomy, and then the surgeon had best be left to adapt his incisions to the particular case. The astragalus may be removed very well by incisions similar to those given for excision of the ankle-joint. Its excision gives excellent results. Excision of the smaller tarsal bones is often by no means a good substitute for amputation.

Excision of Wrist.—Lister's method. Its description includes at least twelve directions, besides the application of Esmarch's bandage. 1. Make first incision (two are required) from dorsum of base of second metacarpal bone upwards as far as base of styloid process of radius, always internal to extensor secundi internodii policis. 2. On the thumb side of this incision separate the soft parts from the bones, carefully because of *radial artery.* At the same time divide the extensor carpi radialis brevior. 3. Sever trapezium from rest of carpus with cutting pliers. 4. Clean soft parts from bones on ulnar side of incision. 5. Make ulnar incision near anterior edge of ulna, and extending from two inches above styloid process to middle of fifth metacarpal bone. 6. Raise all the soft tissues completely from the dorsal surface of the carpus ; then, of course, the two wounds communicate. In doing this the exterior carpi ulnaris should be severed from its insertion. 7. Clean anterior aspect of carpus and ulna, cutting off pisiform bone and hook of unciform bone, so as to leave them attached to the soft parts. Do not go so far forward as to wound deep palmar arch. 8. Divide ligaments and remove carpal bones (except trapezium) with forceps. 9. Clean and saw off ends of ulna and radius. All cartilage of radio-ulnar joint should be removed. 10. Cut off bases of metacarpals so far as they are covered with cartilage. 11. Take away trapezium and base of first metacarpal bone. 12. Cut off cartilage of pisiform and leave the rest, and the hook of the unciform, unless they be diseased. The operation may be shortly summed up thus: The whole carpus except the pisiform and the hook of the unciform, and also the adjacent cartilage-covered parts of the radius, ulna, and metacarpal bones are removed piece by piece, in the order found most convenient, through two longitudinal incisions, one ulnar and palmar, the other dorsal and radial. *Result.*—Very useful hand. *After-treatment.*—Very important. Large lump of cork under palm of hand. Flat wood palmar splint. Regular passive motion from the first Encouragement to active motion.—C. B. KEETLEY.

EXOSTOSIS.—Two kinds of true exostosis, and two allied bony growths. True exostosis is either (1) spongy or (2) ivory. The allied osseous growths are the "exercise-bones" and other ossifications of tendons and muscles, besides "the diffused osseous tumor."

Causes.—Usually unknown. Begin in youth, rarely after 30; male sex.

Pathology.—Spongy exostosis consists of cancellous bone covered with a thin layer of hyaline cartilage. The cartilage grows on its superficial surface, and keeps ossifying on its deep surface. Ivory exostosis has the structure of compact bone, but the Haversian canals are smaller, and the lacunæ less regular. Growth slow, and tends to stop, eventually, without treatment.

Seat.—Spongy exostosis: epiphyses of tibia, fibula, humerus and femur, &c. Ivory exostosis: bones of face and skull, pelvis, scapula and ungual phalanx of great toe.

Characters and Symptoms.—They are recognized by their hard, bony feel, their immobility and their position. The ivory exostosis is especially round, nodulated and smooth. The neck of the tumor varies in size, and this is an important point in treating hard exostosis. They often cause aching and pain in the limb, and may be serious from pressure to important parts.

Treatment.—They should be let alone, unless they cause great deformity or pain, or press upon important parts. For they often are dangerously near to joints, may even be covered by a pouch from the articular synovial membrane; and the hard exostoses of the skull sometimes require great violence to remove them. An incision should be made over the exostosis to be removed, and then saw, chisel or cutting-pliers applied. It is said that the neck need not be removed. But Stanley writes: "Absolute security against the reproduction of an exostosis can be obtained only by the removal of every part of its circumference." If necessary, he adds, the potassa fusa, or nitric acid, may be used to produce exfoliation of the base of the tumor. Diffuse bony tumor may require amputation of a limb or extirpation of an entire bone, and even then it has been known to recur. Nothing can be done for "exercise-bones."—C. B. KEETLEY.

EYELIDS, Diseases of.—Blepharitis, Stye, Tarsal tumor, Warty growths, Molluscum contagiosum, Ulcers, Rodent ulcer, Ptosis, Ectropion, Entropion, Symblepharon.

BLEPHARITIS (tinea tarsi, ophthalmia tarsi, sycosis tarsi) is an inflammatory condition of the edges of the eyelid, which commonly attacks the glands and the follicles of the eyelashes. It varies in degree from mere congestion with a sticky exudation to chronic or subacute inflammatio with thickening of the tissues, excoriations, and even pustules. *Treatment.*—

(1.) Keep the eyelids clean and free from scabs by bathing twice daily with warm water or warm alkaline lotion. (2.) Apply dilute nitrate of mercury ointment twice daily; in severe cases pull out the lashes with epilation forceps, and apply nitrate of silver to the edges of the lids.

STYE (hordeolum) is a small furunculus at the margin of the lid, often very painful. Successive crops very common. *Treatment.*—Foment with warm water, apply bread-and-water poultice; puncture with a sharp lancet as soon as pointing has commenced.

TARSAL TUMOR (meibomian cyst, chalazion) a chronic hypertrophy of a meibomian gland, occurs as a small hard nodole from 1–4 mm. in diameter in upper or lower lids; one or more may appear at the same time. The skin is freely movable over the tumor, which is hard, and not painful. If left alone it generally causes thinning of the conjunctival tissue, or it may point through the surface. *Treatment.*—Evert the lid and remove by incision from the conjunctival surface. When it points outwards it is better to remove through the skin by incision parallel to margin of eyelid. When thus thoroughly removed it does not recur. When only incised it may remain for some time.

WARTY GROWTHS occasionally appear on edges of lid. Remove freely with scissors.

MOLLUSCUM CONTAGIOSUM often appears in region of eyelids. Consists of one or more hemispherical elevations of from one to six mm. in diameter, containing sebaceous material. *Treatment.*—Divide each little tumor by vertical incision, and squeeze out the contents by means of the thumb-nails applied to the bases of each.

RODENT ULCER (epithelial cancer, rodent cancer) begins as a slight elevation near margin of eyelid; this is followed by a shallow ulcer with slightly indurated edges, and generally a brownish incrustation. Mostly occurs in persons over forty. Progresses slowly. Seldom cicatrizes. Attacks all surrounding tissues. Neighboring glands not enlarged. *Treatment.*—Remove all the diseased structure with the knife, or with the thermal cautery, as early as possible. In severe cases apply chloride of zinc paste in addition, after removal with the knife.

SYPHILITIC ULCERS are more acute, more punched out in appearance, have less indurated margins, and are more amenable to treatment than rodent ulcer.

LUPUS generally occurs in younger subjects, and in other parts of the face. It is less indurated and more inflamed than rodent ulcer.

NÆVUS, often congenital, occasionally occurs on the eyelids, may be confined to the skin, or may involve subcutaneous tissue. *Treatment.*—1. By electrolysis. 2. By subcutaneous ligature. 3. By galvano-puncture.

PTOSIS is partial or complete closure of the upper eyelid. Causes, various. May be congenital and due to non-development of the levator palpebræ superioris muscle. May be due to paralysis of the third nerve, which supplies that muscle. May be the result of injury to that muscle.

Treatment varies with cause. Graefe's operation: make incision through skin three lines above the margin of upper lid, and extending through its whole length, and expose the orbicularis palpebrarum muscle; seize the muscle with forceps, excise a portion about five lines in width. In bringing edges of skin together pass the suture through the cut edges of the muscle.

TRICHIASIS, ingrowing of the eyelashes, causing irritation of the globe. Frequently caused by contraction of the tissues after granular lids and after the application of caustics to inside of lids. *Treatment.*—If only a few lashes are turning in, these may be removed by epilation forceps. If many exist, then incision of the hair-bulbs should be performed as follows: Fix the lid by means of compressorium forceps. Make two incisions along the margin of the lid, one on each side of the row of eye-lashes. Cut deeply, unite the incisions at each end, and remove the piece with scissors. Sutures not required.

SYMBLEPHARON is union of the palpebral and ocular conjunctivæ or of the margins of the eyelids. Caused generally by burns, as with molten lead, or caustic, as quicklime. *Treatment.*—1. When the edges of only the lids are united, or when a probe can be passed beneath the united conjunctivæ; (*a*) simply divide adhesions with knife, and keep the parts separated by means of oiled lint; (*b*) pass a strong silk ligature beneath the bands, and tie tightly, allowing the ligature to come away by itself. 2. When no probe can be passed beneath the adhesions, the results of operation are less satisfactory. Separate the parts by incision, and then dissect up the conjunctiva on both sides, and endeavor to bring the flaps thus formed over the raw surface by means of very fine silk sutures; still keep the ocular and palpebral portions apart by oiled lint.

ENTROPION.—Inversion of the eyelids, generally caused by cicatrices after caustics such as lime or nitrate of silver, or after injury. *Treatment.*—When very severe, and the conjunctiva is much contracted, remove the whole row of eyelashes as recommended for trichiasis. When less severe, perform Streatfeild's operation of grooving the cartilage.

ECTROPION.—Eversion of the eyelid; may be partial or entire. *Causes.*—Contraction after injury or inflammation of the parts of the eyelid which are external to the tarsal cartilage; or contraction of cicatrices of the face following burns, lupus, etc. *Treatment.*—Try to prevent the progress of eversion by skin grafting on to wounds of face. When permanently established try a plastic operation.—HENRY JULER.

FACIAL BONES, Fracture of—*See Fractures.*

FACIAL PARALYSIS—*See Paralysis, Local.*

FAINTING—*See Syncope.*

FALLING SICKNESS—*See Epilepsy.*

FALLOPIAN TUBE, Diseases of—ABSCESS OF.—Inflammation may pass into abscess, when great danger arises from the probability of rupture into the peritoneal cavity.

Treatment.—When diagnosed, aspiration.

CANCER OF.—So similar to and masked by cancer in neighboring organs, that differential diagnosis is impossible.

CYST OF.—*Definition.*—Cysts varying in size from a small pea with a long pedicle (as seen in some necropsies) to that of a large ovarian cyst, taking their origin from the broad ligament. *Causes.*—Unknown. *Symptoms.*—Scarcely any. *Signs.*—If large enough, similar to ovarian cysts, but with less disturbance of the system. *Diagnosis.*—By examination of the contained fluid, which is clear, nearly colorless, with a slight blush tinge, and non-albuminous. *Prognosis.*—Favorable. *Treatment.*—Tapping.

DROPSY OF.—*Definition.*—Tubal dropsy, distention of the tube by fluid. *Causes.* Distention by pus, mucus, or menstrual fluid. *Symptoms.*—Similar to a small ovarian cyst. *Signs.*—The swelling is felt to be of a peculiar wormlike length, and for its size is not so movable as an ovarian cyst. *Diagnosis.*—Very difficult. The shape may be a guide. It is long, tense, and wavy. *Treatment.*—Aspiration.

INFLAMMATION OF.—*Definition.*—Salpingitis, Inflammation affecting the lining membrane. *Causes.*—Puerperal or other endometritis, or gonorrhœa. *Symptoms.*—Difficult to localize, as acute inflammation passing into peritonitis is masked thereby. *Signs.*—Local tenderness, separable with difficulty from ovaritis or local peritonitis. Patency may be rendered evident by the sound entering the duct. *Prognosis.*—Unfavorable from the tendency to peritonitis from contiguity, or from the products of the inflammation passing into the cavity of the abdomen. *Treatment.*—Rest, leeches to the groin or uterus, opium, avoidance of coitus.

STRICTURE OF.—*Definition.*—Narrowing of some portion of the duct. *Causes.*—Salpingitis, pelvic peritonitis, mechanical pressure from fibrous or other tumors, atrophy. *Symptoms.*—Sterility, if both tubes are affected. *Treatment.*—None.—HEYWOOD SMITH.

FARCY—*See Glanders.*

FATTY TUMOR—*See Tumors* (*Lipoma*).

FAVUS—*See Tinea Favosa.*

FEAR, Morbid.—The emotion of fear is normal to the human mind. It is as natural and as necessary to be afraid as to be courageous. Fear is, indeed, a part of the first law of nature, self-existence. This emotion is, therefore, physiological, varying both in degree and kind, with race, sex, age and the individual. In neuropathology, especially in the pathology of functional nervous diseases, the difference between health and disease, is of degree rather than of kind; the phenomena that belong to what we call health, passing by indefinite and not distinctly defined gradations into the phenomena of what we call disease; pathology being, in truth, as has been said, but the shady side of physiology.

Morbid fears are the result of various functional diseases of the nervous system, and imply a debility, a weakness, an incompetency and inadequacy, as compared with the normal state of the individual. A healthy man fears; but when he is functionally diseased in his nervous system he is liable to fear all the more; to have the normal necessary fear of his physiological condition descend into an abnormal pathological state, simply from a lack of force in the disordered nervous system.

Thus it comes to pass that with the development of functional nervous diseases in modern times, particularly with the increase of neurasthenia in its various phases, there has been an increase in the forms of morbid fears, and in the number of their manifestations. When any special phase of morbid fear assumes a considerable frequency and consistency, so as to allow of classification, it is proper and convenient to give it a special name by which it can be known, described and referred to. With the understanding that these morbid fears are symptoms of diseases, rather than diseases of themselves, simply belonging to a large family of symptoms, it is a very important convenience to be able to recognize them, to interpret their meaning, to understand their relations to the other members of the same family of symptoms, and to be familiar with their diagnosis and treatment. It would probably be a correct statement to say that no symptom of functional nervous disease is so likely to be overlooked, or slighted, or misinterpreted, or improperly named, as this one symptom of morbid fear; it is diagnosticated as hysteria, hypochondria, dyspepsia, imagination, biliousness, and actual insanity. Insanity has, it is true, its morbid fears, but they are associated with delusions or hallucinations.

There are quite a number of varieties of morbid fear associated with cerebrasthenia, or brain exhaustion, without any hallucinations or delusions. The patient knows that there is no just, objective ground for his fear, but his emotional nature, under the influence of his exhausted nervous condition, overcomes his reason.

A number of years ago, I described a form of morbid fear under the term astraphobia, or fear of lightning from the Greek astrape and phobos, fear. Of this disease I have seen quite a number of cases, and have nothing to say in regard to it beyond what has been already published.

The leading symptoms are headache, numbness and pain in the back of the head, nausea, vomiting, diarrhœa, and, in some cases, convulsions.

These symptoms are preceded and accompanied by great dread and fe
One of my patients tells me she is always watching the clouds in summer fearing that a storm may come. She knows and says that this is absurd and ridiculous, but she declares she cannot help it. In this case the symptom was inherited from her grandmother, and even in her cradle, as she is informed by her mother, she suffered in the same way. A lady now under my care, the wife of a clergyman, was first attacked with these symptoms six years ago, in connection with other symptoms of general neurasthenic and uterine difficulties. Her husband tells me that on the approach of a thunder-storm he is obliged to close the doors and windows, darken the room, and make things generally inconvenient for himself and family.

Westphal more recently has described a form of morbid fear under the term agoraphobia, or fear of places. This title, however, is quite inadequate to express the many varieties of morbid fear which the expression, fear of places covers. The Greek word agora, from which Westphal derives his term, means an open square—a market place, a public place where assemblies were held—and as applied to the cases first described by him, the term is practically, though not etymologically, a correct one, for the fear of going across open squares or places, at a distance from houses or shops, was the chief feature in the cases described by him. This fear of open squares or places is, however, but one of a large number of phases that the fear of places assumes, as I have elsewhere described. In strictness, fear of places should be derived from the Greek word topos, place, a general term, while agora is a special kind of place; agoraphobia would, therefore, be a species of topophobia, a general fear of places, which symptom seems to be capable of infinite variety. Thus one of my cases, a gentleman of middle life, could walk up Broadway without difficulty, because shops and stores, he said, offered him an opportunity of retreat in case of peril. He could not, however, walk up Fifth avenue, where there are no stores, nor in side streets, unless they were very short. He could not pay a visit to the country in any direction, but was hopelessly shut up in the city during the hot weather. One time in riding in the stage up Broadway, on turning into Madison square, he shrieked with terror to the astonishment of the passengers. The man who possessed this interesting symptom was tall, vigorous, full-faced, and physically and mentally capable of endurance. He had, however, other symptoms of cerebrasthenia. These fears take opposite phases; thus, with one it is impossible to go to a certain place, where he was perhaps first attacked with the evil symptoms. And another finds it impossible or very difficult to go out of his house to any distance where business calls. I have now under care a patient who for a long time has been shut up in his house, unable to go anywhere simply from fear of going anywhere. For a long time he was unable to come to consult me, but now I see him regularly; but he did not, until lately, since he has improved, go anywhere else. Quite a number of persons I have seen who find it difficult to go on long journeys, and if they do go must have company. A person wrote me from a distant city in the West expressing a desire to come and consult me, but upon reaching a city at some distance was compelled to return home without reaching New York. All these forms of morbid fear—fear of leaving home, fear of going to any locality or in any direction. fear of travel—are properly varieties of topophobia, the fear of open squares or places being relegated, though not quite correctly by agoraphobia.*

Dr. Meschede brought to the attention of the physicians at Cassels, in Germany, a form of morbid fear quite the opposite of what is known as agoraphobia, or fear of open places. In his case the symptom was fear of close, narrow places. The patient, a young man twenty years of age, was seized with a feeling of giddiness and confusion when in a small, narrow room. In the summer he could not sleep in a room at all but was obliged to camp out; in winter he slept in a large, airy room. He was obliged to give up his studies and become a farmer. This symptom cannot be classed as agoraphobia at all, for it is the reverse condition. It belongs properly to what I call topophobia, fear of places and is, like agoraphobia, a species of which topophobia is the genus.

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* In entymological strictness agoraphobia means fear of large assemblies of human beings, and not of the place where the people meet.

A form of fear I have lately described in anthropophobia, derived from the Greek anthropos, man, and phobos, fear. This term applies to aversion to society, a fear of seeing, encountering, or mingling with a multitude, or of meeting anyone besides ourselves. This phase of morbid fear has different varieties. One form is gynephobia, fear of women, from the Greek gune, woman, and phobos fear. Some patients afflicted with cerebrasthenia have no fear of male society, but are particularly timid at even the approach of females. They can mingle with men in ordinary business relations, but dread to go in any company where women are found, even when not particularly bashful. A person once consulted me for gynephobia which took on a peculiar form; he being only afraid of women in the society in which he moved; women of the lower order he cared nothing for, and he had no anthropophobia, or fear of man. In quite a number of cases this fear of man is so severe as to compel patients to give up business entirely; and I know a number of cases where men of strong muscles and having the appearance of great physical strength have been compelled through this symptom alone to withdraw from the occupations in which they were engaged; they could not face men, deal with them, persuade them to buy or sell, or have any influence over them; they dreaded to meet a human being. This form of morbid fear is often accompanied with turning away of the eyes and hanging down of the head, but not necessarily so, and usually so only in the severer cases. This phase of morbid fear is a very good barometer of the condition of the system. From this alone we can often judge whether the patient is improving or growing worse. It is a very interesting symptom. In some cases I hold the head of the patient between my hands so as to bring his face opposite mine, and even then he will involuntarily turn away his eyes. This phase of morbid fear also has its opposite. In some persons there exists what may be called monophobia, or fear of being alone. Some of these persons cannot travel alone, but have no difficulty in traveling if they are in company with some one. Sometimes they cannot walk the street alone or leave the house except in company.

A married lady consulted me, with many symptoms, the chief of which was what I call monophobia—fear of being alone, joined with fear of traveling. This symptom came upon her suddenly, almost like a stroke of lightning, at the Exposition at Chicago, her friends having left her for a few moments alone while she was in a state of nervous depression.

This symptom—monophobia—is common enough, but it is rarely so bad as in the case of this lady; she must not only have a *companion* but *companions*—a body guard. When she came to see me she came with her mother and sister. In traveling long distances by a railway journey for a day or more, she requires three persons, and thus she is perforce a queen—the very excess of her nervousness making necessary the pomp of royalty. She said she could not come alone; or even with her husband, for he might leave her alone for a few moments, but her mother would be more likely to stay with her, and this thought gave her a feeling of greater security with her mother and sister than when she came with her husband.

Her mother told me that some one must always be with her, even at home; if she even suspects that they are going out to leave her alone, her countenance will change, she will show her fear at once in her face.

This lady is not a fool, and she is not crazy; she is bright, intelligent, intellectual, a remarkably brilliant conversationalist, and is fully able to comprehend her condition.

As a girl, she was lively, not melancholy; but she came of a nervous family, or rather from a family in which there was a nervous tendency; and in her case nervousness takes the form of mono-hypochondria—a special form of mental impairment, which is not insanity, and is not likely to develop into insanity.

There is also in the case of this lady pantophobia—a dread or fear of everything. She has a dread of assuming responsibility: for example, she plays the piano well, but cannot play in public if announced before hand.

A form of morbid fear that has long been known to the profession is pathophobia, or fear of diseases—more commonly known as hypochondriasis. This form of morbid fear seldom exists alone, but is found in company with other symptons—some real disorder of the nervous system. The pathophobic sufferer, with brain or stomach, or both, exhausted for some reason, may fear disease of the heart, of the stomach, or of the brain, or of the reproductive system, even when there is no sign of disease except his fear. The mistake usually made in the study of these cases is to assume that this fear of disease is the only symptom which the patient has, and that it is the cause of the disease; whereas, usually, it is the result of the disease, whatever the cause may be; and as such should be studied and treated.

There is a manifestation of morbid fear which is not uncommon, and to which we might perhaps give the term pantaphobia, or fear of everything; all responsibility, every attempt to make a change of movement being the result of dread and alarm. The wife of one of my patients has a morbid fear in reference to one of her sons, a lad of about fifteen years of age; and so distressed is she by it that she cannot allow him to go out of the house or out of her sight; fearing lest he may be kidnapped, or some harm may come to him, as in the case of Charley Ross. The poor fellow is thus kept a prisoner most of the time, and the whole family is disturbed and annoyed. He must remain in the city during the summer, as she cannot allow him to leave town; and at no season can he go anywhere unless accompanied by his tutor.

A lady now under my treatment who is also astrophobic, tells me that she is afraid to go into the street, to do any shopping, or attend to any business; that it is an affliction for her to come to see a physician; everything is a dread to her, even when there is no draft made upon her physical strength.

The expression phobophobia—fear of fears, might possibly apply to a certain class of nervous patients, who fear they may fear, provided they make an attempt to move or go in any direction where their morbid fear is in the way; they are afraid even when they do and say nothing. These persons fear, when they are entirely still and inactive, from a fear that if they attempt to do anything they will be attacked with their especial morbid fear. One of my patients—a stout, and large man—in addition to topophobia (fear of places) had at one time a fear of committing some crime against women that would disgrace him. He was ashamed of his fear; he could not help it, although he has now entirely recovered.

Mysophobia, fear of contamination, lately described by Dr. Hammond, comes under this head; the results of the treatment showing very clearly that it is symptomatic of a similar or analogous condition of the brain. In those cases there were no hallucinations or delusions.

Among other morbid fears of the same general character that cannot be well characterized are the following:

Fear of meeting drunken men.

One of my patients would go far out of his way to avoid even the possibility of meeting intoxicated persons; would not go on a ferry if a drunken man was on board.

Fear of riding on the N. Y. Elevated Railroad.

A lady under my care can ride on ordinary railways and in all public conveyances, except on the elevated road.

Fear of going to a theatre while able to attend an opera.

Fear of a crowd is common enough; that is a part of the fear of man, and it is complicated with the fear of place and the fear of fire or pyrophobia.

Fear of saying or doing some ridiculous or criminal; or shy, foolish, out in company.

Fear of doing some injury to oneself or others, as choking or stabbing, and the like. These morbid fears, are not necessarily indicative of insanity. They are experienced for years by those who never do the things they fear.

Fear of the sea and ships.

This fear is to many normal, but it is sometimes abnormal and extreme, making it impossible for the sufferer to take a sea voyage.

In regard to all these different forms of morbid fear, by whatever name they are known or described, these general propositions are true and verifiable.

First.—These morbid fears are symptomatic of functional, never, or rarely, of organic diseases. The existence of any of these symptoms in a doubtful case of diagnosis, would, alone, almost establish the nature of the disease, or enable us to give the casting vote.

The best test of skill in the practice of neurology is in making a differential diagnosis between functional and organic diseases in their early stages; for this cause alone morbid fears demand close attention.

While it is possible for hysterical and neurasthenic symptoms to appear and maintain themselves, more or less, in organic diseases, yet these symptoms of morbid fear are not found, according to my observation, in what we call organic or structural diseases of the brain or spinal cord; it is strange that they are not, but the fact as here related is verifiable.

They are not usually found in insanity itself, and the habit of calling them forms of mania or delusion, is not based on fact or a right study of these cases. I observe that even now some forms of morbid fears are classed under insanity, or mania of some kind, even when there are no delusions or hallucinations. When the insane have morbid fears such as I have described, or very many others which they may have, and do have, as we all know, they are delusions out of which they cannot be reasoned, and are a part of, and in harmony with other delusions of the insane. But in all the cases to which I have here referred, there are no hallucinations whatever; the patient is as well aware of his delusion as his friends are, and is as anxious to get rid of them as he would be of a sick headache, fever, or paralysis; but he is unable to shake them off until the exhausted brain, of which they are the direct result, is strengthened by hygiene, time, and treatment.

Second.—These symptoms may come on suddenly, in some cases almost instantaneously, and when once they appear, they may exist for months and years, varying in intensity at different times, like other symptoms of cerebrasthenia, with which they are often associated.

Third.—These morbid fears are very frequently, though not always or necessarily, the result in whole or part of disorder of the reproductive system.

Excess in the male in the natural or unnatural ways, or prolonged and teasing continence united with sexual excitation, and, in the female, various slight and superficial uterine erosions, or displacements or lacerations are the common provoking causes of these morbid fears, especially in constitutions where the nervous diathesis predominates.

These fears may exist long after the local difficulty has been cured; in this respect these symptoms follow the law of the nervous symptoms with which they are so often associated. Some of these cases are anæmic, but the majority are not so, and many are models of physical strength.

Fourth.—These morbid fears rarely exist alone. They almost always appear in connection with other symptoms of neurasthenia, either myelasthenia, exhaustion of the spine, or cerebrasthenia, exhaustion of the brain; most frequently the latter. I think, indeed, that I have never seen a case of morbid fear, such as I have here described, that existed alone, without some one accompanying neurasthenic symptom, or many such symptoms. In some cases, I admit, these accompanying symptoms are few and slight, and can be ascertained only by careful study.

Among those associated symptoms may be mentioned palmar-hyperidrosis, flushing of the face, a feeling of profound exhaustion, insomnia, hopelessness, shooting pains in the extremities, excess of oxalates and urates in the urine, heaviness of the loins and limbs, dilated pupils, local spasms of muscles. Only rarely, however, is there a complete picture in which all these symptoms are represented. Like all these symptoms of neurasthenia morbid fears very often occur in those of great, even enormous, muscular strength and endurance; many of them can walk and work all day with muscle and with brain, but in the presence of their special fears they are as infants.

A very frequent accompanying symptom is dizziness. Many of these cases, when they approach the object of dread, or even think of approaching it, are seized with vertigo—sometimes with less defined abnormal sensations.

Auriform Sensations accompanying Morbid Fears and Mental Shocks.—These fears are accompanied or are liable in some cases to be accompanied during an exacerbation or at the beginning of an exacerbation by sensations resembling the auræ of epilepsy. These sensations may be called *auriform* or *auroidal.* I have seen many cases illustrating these auriform sensations.

These sensations, which patients variously describe as thrills, or spasms, or throbs, or beatings, or blows, or shocks, or fainting feelings appear in the organ that is functionally the weakest. Very frequently in the heart or stomach, sometimes at the back of the head, in other cases the reproductive system, the womb, ovaries and clitoris in woman, and the prostate and perineum in the male. One man who consulted me experienced the sensation in the pit of the stomach whenever he thought of his mother-in-law.

I have seen three cases where an epigastric spasm appears on attempting or even thinking of doing anything which is a dread. I have now under care a patient who tells me that he has a spasm in the stomach whenever he thinks of doing anything where he fears a failure. He describes it as a sudden sinking—a falling, somewhere between the base of the lungs and the navel.

This patient has also a large array of correlated nervous symptoms, such as sweating of the hands, twitching of the eyelids, mental depression, etc. One of these cases had this symptom of spasm—sinking in of the stomach—while at school, and it would come upon him whenever he was called upon, or feared he might be called upon, to recite; even the thought of responsibility, though it might be in the remote future, brought on the attack. The very existence of a morbid fear suggests to us that we search for other symptoms.

Fifth.—The treatment of morbid fear is the treatment of the condition of the brain, of which it is a symptom of the local or general condition on which the brain exhaustion depends; very generally stated this condition requires both constitutional and local treatment. The constitutional treatment includes the whole array of sedatives and tonics, the more effective being the bromides, and electricity; and counter-irritation at the back of the neck and in the bowels by means of cathartics. The local treatment in cases of disorder of the prostatic urethra in males consists in my own practice of the following procedures; very mild electrolysis with the urethral electrode—application of liquor bismuthi—of iodoform, by suppositories, by sounds, and dry cold in the urethra and the rectum.

These cases can be cured, and be permanently cured, but cannot be cured suddenly nor usually by a single prescription. They have been sick before we see them for months and oftentimes for years. The details of the treatment must be varied with the idiosyncrasy of the patient. The causes of failure are three-fold. First, the exclusive use of general treatment by medication, the local irritation from which the symptoms start being undetected. Secondly, the use of stimulants where sedative treatment is required. Thirdly, the want of change in the modes and details of treatment, and perseverance in their use.—GEORGE M. BEARD.

FEBRICULA.—A considerable number of cases come under observation in ordinary practice which present the usual symptoms of fever, but which cannot be referred to any of the contagious fevers, nor can the symptoms be traced to any adequate local cause. Besides these, anomalous forms are not uncommonly met with, to which various names have been applied. Though many of these cases scarcely come under the class of acute specific fevers, they may be conveniently described here.

Etiology.—Simple febricula does not seem to be contagious, or to depend upon any specific poison as a rule. It may result from cold; excessive heat, such as prolonged exposure to the sun; overeating or drinking; or great fatigue. In many instances no distinct cause can be made out. Probably some cases of so-called febricula result from the action of one of the contagious poisons, modified by the constitutional condition of the individual, or by the quantity entering the system being very minute. I have known a severe epidemic of typhoid fever to be preceded by cases which would be classed as mere febricula.

Symptoms.—Febricula is characterized by the ordinary signs of fever in their most typical and simple form, but of variable intensity. The invasion is indicated either by chilliness or slight rigors, with general pains, lassitude, and headache. Afterwards the skin becomes hot and dry, and the pulse frequent and full. Severe headache is usually complained of, the face is flushed, while the patient is restless, and sometimes a little delirious at night. There is thirst, with a furred tongue, loss of appetite, and constipation. The urine presents febrile characters. Frequently symptoms are present indicative of catarrh of the mucous membranes, but these are not sufficient to account for the pyrexia. Roseolar or erythematous eruptions have been observed in some instances, and in others certain bluish spots on the skin have been described.

The temperature rapidly ascends, and it may reach 102°, 103°, or even 104° in a few hours. This high temperature, however, if it occurs, only lasts for a short time usually, often but a few hours, or at most one or two days, and then it falls rapidly.

Duration and Termination.—The duration of febricula is generally about three or four days, but a week or ten days may elapse before convalescence is complete. Defervescence usually takes place by crisis, the temperature falling to the normal in from twenty-four to thirty-six hours, there being also a copious discharge of urine, with abundant deposit of lithates, free perspiration, and sometimes diarrhœa or epistaxis. Occasionally defervescence takes place by lysis, convalescence being consequently delayed. The termination is always in recovery.

Treatment.—All that is required is to keep the patient in bed, to give a diet of milk and beef tea with cooling drinks, to open the bowels freely, and to administer some simple saline mixture, such as a solution of citrate of potash or liquor ammoniæ acetatis. If there is much heat of skin, tepid sponging is very useful. During convalescence quinine may be given.—FREDERICK T. ROBERTS.

FEBRIS CATARRHALIS—*See Influenza.*

FEBRIS EXANTHEMATA ARTICULARIS—*See Dengue.*

FEMUR, Fracture of—*See Fractures.*

FEVER AND AGUE—*See Malaria.*

FEVER, Bilious—*See Malaria (Remittent Fever).*

FEVER, Break-bone—*See Dengue.*

FEVER, Bulam—*See Yellow Fever.*

FEVER, Cerebro-Spinal—*See Cerebro-Spinal Fever.*

FEVER, Cess-Pool—*See Enteric Fever.*

FEVER, Child-Bed—*See Puerperal Fever.*

FEVER, Broken-Wing }
FEVER, Dandy } —*See Dengue.*

FEVER, Endemic—*See Malaria (Remittent Fever).*

FEVER, Enteric, }
FEVER, Entero-Mesenteric } —*See Enteric Fever.*

FEVER, Epidemic Inflammatory, of Calcutta }
FEVER, Eruptive Articular }
FEVER, Eruptive Epidemic } —*See Dengue.*
FEVER, Eruptive Rheumatic }

FEVER, Five or Seven Day—*See Relapsing Fever.*

FEVER, Gastric }
FEVER, Gastro-Bilious } —*See Enteric Fever.*

FEVER, Hectic—*See Hectic Fever.*

FEVER, Intermittent—*See Malaria.*

FEVER, Irish Famine—*See Relapsing Fever.*

FEVER, Jungle—*See Malaria (Remittent Fever).*

FEVER, Malignant Purpuric—*See Cerebro-Spinal Fever.*

FEVER, Mild Yellow—*See Relapsing Fever.*

FEVER, Milk—*See Milk Fever.*

FEVER, Paludal—*See Malaria.*

FEVER, Peculiar Epidemic—*See Dengue.*

FEVER, Periodic—*See Malaria.*

FEVER, Pestilential—*See Plague.*

FEVER, Petechial—*See Cerebro-Spinal Fever.*

FEVER, Puerperal—*See Puerperal Fever.*

FEVER, Pythogenic- *See Enteric Fever.*

FEVER, Relapsing—*See Relapsing Fever.*

FEVER, Remittent—*See Malaria.*

FEVER, Rheumatic—*See Acute Rhematism.*

FEVER, Scarlet—*See Scarlet Fever.*

FEVER, Simple Continued—*See Febricula.*

FEVER, Spotted—*See Cerebro-Spinal Fever*

FEVER, Stiff-Necked
FEVER, Three-Day } —*See Dengue.*

FEVER, Typhoid—*See Enteric Fever.*

FEVER, Typhus—*See Typhus Fever.*

FEVER, Yellow—*See Yellow Fever*

FIBROMA
FIBROMATA } —*See Tumors.*

FIBULA, Dislocation of—*See Dislocations*

FIBULA, Fracture of—*See Fractures.*

FILARIA LOA—*See Guinea-worm Disease.*

FINGERS, Dislocation of—*See Dislocations.*

FISH-SKIN DISEASE—*See Ichthyosis.*

FISTULA—*See Anal Fistula, Lachrymal Fistula, etc.*

FISTULA IN ANO—*See Anus, Diseases of.*

FISTULA, Recto-Urethral.—Recto-urethral fistula occurs as a consequence of an abscess which is situated in the tissues between the bowel and the urethra, and quite commonly it is located in the prostate gland. The usual termination of these abscesses is in perineal fistula, having one end of the sinus or sinuses either in the urethra or rectum, forming a urethral or anal fistula; occasionally the termination is by opening externally through the perinæum, and internally both by the rectum and urethra, or recto-urethro-perineal fistula. Still more rarely they open into the urethra and rectum without any external orifice, and they then constitute the most troublesome and annoying of all varieties, the recto-urethral. It is unnecessary to speak here of the manner of formation of the abscesses which result in the formation of sinuses, or of the treatment of fistula except where it exists as a communication between the bowel and the urethral canal only.

This condition is first made evident by the appearance in the urine of fecal matter, more rarely by the patient passing urine by the anus, especially when at stool; and sometimes air will be voided through the urethra. These symptoms are usually preceded by those of abscess in the perinæum. When a patient presents himself complaining in the above manner, a thorough examination should be made both by the rectum and urethra. A steel sound should be passed into the bladder, the finger then introduced into the rectum, and the prostate and tissues lying between the two carefully felt. If the rectal opening of the sinus is too high to be reached by the finger, or if it be situated beyond the stricture, the walls of the sinus may still be made out with tolerable certainty. The Bodenhamer speculum should next be introduced, and a probe bent to the proper curve may be passed through the sinus and made to strike the sound in the urethra.

With the symptoms above enumerated, the only possible malady with which recto-urethral fistula could be confounded is recto-vesical fistula. The points of difference are as follows: In recto-urethral fistula the urine passes by the bowel only during the act of micturition, in recto-vesical it may do so at any time. In recto-urethral fistula the fæces may pass by the urethra at any time, in recto-vesical this occurs only during the act of micturition. These points, in connection with the physical examination, will serve to establish a positive diagnosis.

Before we can proceed to intelligently treat this variety of fistula, the cause of the abscess which gave rise to it must be ascertained. Often it is due to stricture of the urethra, and is caused by the urethra behind the ure becoming ulcerated, some urine escaping into the surrounding s, there putrefying and giving rise to an abscess. In stricture of the um the same thing happens, fecal matter escaping and acting in a man- similar to that of the putrefying urine. In cases of this kind all treat- nt directed immediately to the fistula would prove unavailing, unless the icture were first attended to. This should be relieved in one of the usual s, when the fistula will generally heal without any further interference, specially if it be of recent occurrence. Should it prove obstinate, however, or where no such obstacle as a stricture exists, rest in the recumbent position, opium to keep the bowels quiet, with an enema every few days to clear them, and the daily emptying of the bladder by means of a catheter, will often have the desired effect. When these means fail *the sphincter ani should be ruptured* and the whole fistulous tract cauterized with the fused nitrate of siiver, (See *N. Y. Med. Jour.* Feb. 1876), or the galvano-caustic wire might be substituted for the nitrate of silver. Sir Henry Thompson reports a case ("Holmes's Surgery," vol. iv. p. 986) where he effected a cure by placing the patient flat on his face during the act of micturition, so as to make the urine pass through the urethra. This method should be tried before resorting to the operation done by Drs. Nott and Emmet (*New York Medical Journal*, September, 1870), which consists in incising all the tissues from without down to and into the sinuous track, paring the walls of the sinus and bringing the wound together in the manner adopted by Dr. Emmet in his operations for fistula in the female. This has been done in but one instance, and the favorable result of the operation justifies its repetition.—EDWARD J. BERMINGHAM.

FISTULA, Recto-vaginal.
FISTULA, Recto-vesical.
FISTULA, Utero-vesical.
FISTULA, Vesico-vaginal.

Fistulous openings may exist 1st, between the urethra and vagina; 2nd, between the bladder and vagina; 3rd, between the bladder and uterus, 4th, between the vagina and rectum. In certain cases a common communication may open bladder, vagina, and rectum into one. We shall omit here all consideration of openings caused by the extension of cancerous ulceration, since they are quite beyond surgical treatment. The various forms of simple fistulæ usually result either from contusions or lacerations in parturition, from the introduction of foreign bodies, or from the effects of calculous concretions in the bladder, or operations for their removal.

The inconvenience caused by any communication between the bladder and adjacent cavities is extreme, since it is usually attended by constant incontinence of urine. A larger opening may, however, exist between the rectum and vagina without exposing the patient to much annoyance, since in many cases the involuntary escape of fæces occurs only when the motions are unusually fluid. So great and so general has been the success obtained by operators in the cure of most of these forms of fistula, that it is scarcely worth while to occupy space by reference to less efficient modes of relief. It is admitted on all hands that, although by the use of the actual cautery small fistulæ may be much diminished, yet that they can very rarely indeed be made wholly to close, and the after-treatment in these cases is just as irksome as in those of operation. On the other hand, the results obtained by Dr. Bozeman, Mr. Brown, Mr. Bryant, Dr. Marion Sims, the late Sir James Simpson, and Mr. Spencer Wells, have been so exceedingly satisfactory that we may fairly rank the operative cure of these distressing conditions as a finished achievement.

Considering the want of success which attended the attempts of the earlier surgeons, some of whom (especially Dieffenbach) devoted attention very perseveringly to the subject, it suggests itself as a most interesting question in practice, to what precise improvements have recent results been due? Speaking chiefly of vesical fistulæ, I think we may mention the following as amongst the chief: 1st, the use of chloroform, which enables the operation to proceed with much increased facility in the difficult steps of the dissection; 2nd, the use of metal sutures instead of silk; 3rd, the avoidance of the vesical mucous membrane, both in the dissection and in the application of the sutures; and, lastly, increased attention to keeping the bladder empty afterwards. A few years ago much reliance was placed on metallic or wire shields, adjusted over the line of union; but these are now generally discarded, and reliance placed on sutures alone.

The following are the steps of the operation in a case of vesico-vaginal fistula: The patient should be in her best state of health, and the bowels should have been well cleared out. Chloroform having been given, the woman is placed either on her side, with the knees well drawn up, or in the usual lithotomy position. The parts being well exposed by the duck-bill speculum, and the nates being held widely apart by an assistant, the operation proceeds to drag the opening as low down as possible, with a view to facilitate the paring of the edges. This may be accomplished either by hooks, blunt or sharp; by the use of a metal suture; or by the introduction of a flexible sound by the urethra, which is brought out again through the fistula, and then bent backwards. This latter plan furnishes the surgeon with a most efficient hook, and one which cannot easily slip. In paring the edges, it is necessary thoroughly to denude every part; for if the smallest portion of mucous membrane be left, it may prevent union. None of the mucous membrane of the bladder must be removed. The wound should present a bevelled oblique line, slanting from a large vaginal opening to a smaller vesical one. The denudation being complete and free, sutures are next to be introduced. These should be passed obliquely from at least a third of an inch outside the edge of the incision. They must not include the mucous membrane of the bladder. The tightening and tying of wire sutures is easily accomplished by the fingers. Care must be taken not to pull them too tight, so as to invert the edge of the vaginal mucous membrane. The instruments used in these procedures consist of small knives, forceps, and needles of various construction. Startin's tubular needle for carrying wire is in most cases the best. Provided the precautions insisted on, as to avoidance of the mucous membrane of the bladder, be observed, it does not appear that there is such great difference in result from wire or silk ligatures as was at one time supposed. Still it is certain that wire is not more irritating than silk; and as it is at least equally easy to use, it may be considered preferable.

The after-treatment consists chiefly in great attention to keeping the bladder empty. A catheter, either the small silver one introduced by Dr. M. Sims, or a common flexible one, should be retained; and it should be a nurse's duty to see that the urine is constantly flowing. The catheter should be changed and cleaned twice daily; and if at any time the flow of urine stop, it should at once be examined. The patient must lie on her side, with the knees drawn up, and every attention must be paid to sustaining her general health.

The sutures may be left in almost indefinitely; and unless it is clear that the operation has failed, they should certainly not be removed till the ninth or tenth day. If cicatrization has occurred, they will cause no inconvenience; and their retention a few days longer than is absolutely necessary is a matter of no consequence, whilst their premature removal is a very grave error. It is needless to say that their removal should be effected with every precaution.

The nearer the fistula is to the urethra, the more easy is the operation in performance, but the greater is the chance that it may fail. One difficulty in closing urethral fistula arises from the fact that the catheter almost necessarily presses upon the line of union.

In cases in which the fistula is very high up—or it may be even connects the bladder with the cervix uteri—certain modifications in the plan of operation will be required. It may even become desirable to obliterate the upper part of the vagina, and to connect the uterus with the bladder, thus allowing the menstrual fluid to pass per vesicam, but preventing the incontinence of urine.

The operation in cases of recto-vaginal fistula does not differ materially from that just described. The paring of the edges must be practiced in a similar manner, and care must be taken to avoid the rectal mucous membrane. The bowels must be kept from acting for ten days subsequently, and it may be well also to retain a catheter in the bladder. Whether or not the sphincter ani should be divided will depend upon the degree of tension which is present when the parts are brought together. It is not a slight measure, and should not be needlessly resorted to. In these as in the preceding cases, the unencumbered suture of twisted wire is better than any form of compress or button, and far better than the shotted oue. After the operation the vagina should be washed out by injections of tepid water daily.—JONATHAN HUTCHINSON.

FISTULA, Urinary.—The external openings of these passages are most commonly seen in the perineum and scrotum, which are traversed by them in various, and often circuitous, routes; less frequently they are observed in the groins, the upper part of the thighs, the adjacent part of the nates, or even above the pubic symphysis. In the last-named situation, the devious channel usually results from incisions made to relieve extravasation; but in the scrotum or perineum it is generally due to a previously-existing urinary abscess.

Under the term "urinary fistula" all these conditions are commonly included; some of them simple, and easily amenable to treatment; others complicated, and requiring much care and time in order to obtain a successful result. Some are merely narrow channels through nearly healthy parts; others pass through structures indurated and deformed by repeated deposits of plastic matter, and sometimes connected with cavities secreting pus, and detaining in their interior some quantity of the urinary secretion. The external orifices of the fistulous passage may be few or numerous; being in the latter case the outlets of sinuous channels springing from the original track, and giving exit to a number of small streams when the act of micturition is performed. And lastly, besides the foregoing, there are those openings into the urethra which have their origin in loss of substance by sloughing from extravasation, phagedænic ulceration, or violent injury to the parts; and these abnormal conditions are distinct in their nature from the two preceding classes. This mode of arranging the numerous and widely-differing lesions comprehended under the general term urinary fistulæ, indicates three forms of morbid condition, and requiring appropriate treatment.

1. Simple fistulæ. The first class embraces those cases where, in connection with stricture of the urethra, one or more fistulous passages exist, the surrounding parts being not much altered from their natural or healthy condition. These openings are the result of nature's mode of affording relief in cases of narrow stricture; they act as safety-valves to the pressure exerted upon important organs behind the obstruction. Thus we often see patients enjoying fair health and comfort, notwithstanding large fistulous passages in the perineum, by which all their urine is passed. But the annoyance, sometimes the pain, besides the tendency to grow worse, which accompany urinary fistula, to say nothing of considerations arising

in relation to the sexual function, demand the interference of the surgeon to bring about a natural state of things.

For these cases, as a rule, nothing else is required than to dilate freely the urethra. The urine will flow by the natural channel, and the fistulæ will heal of themselves, if we insure a free passage from the bladder. Those patients who form the exceptional instances to this rule are for the most part weak in constitution, have little reparative power, or are subjects of some chronic disease in addition to stricture of the urethra. The management of these is mostly that of the next class. 2. Cases in which the fistulæ pass through tissues indurated and deformed by inflammatory exudation.

In these cases also, the primary object is to dilate adequately the stricture, and to observe the effect induced. In some of them it is sufficient to enable the fistulous passages to heal slowly. Dilatation, however, having been maintained for some time, and little or no benefit having resulted, it will be desirable either to stimulate the walls of the fistulæ themselves, and so bring about adhesion of opposing surfaces; or to lay them open, in order to produce recent and healthy wounds, so that they may heal up soundly from the bottom.

At the same time we must attend closely to the patient's general health, seeking to maintain the secretions in a natural condition. Various agents have been employed to stimulate the indolent fistulæ; one of the best is the concentrated tincture of cartharides, applied on a camel's-hair brush, or with a fine syringe. Solutions of the sulphate of zinc or copper, and of the nitrate of silver injected by the syringe, sometimes give good results. An excellent mode is to introduce carefully, as far as possible, a small and flexible silver probe, coated with nitrate of silver; a plain probe having been introduced beforehand as a guide to the length and direction of the passage. It often happens that the external orifice of the sinus is smaller than any other part; in such a case, a little caustic potash should be applied for the purpose of enlarging it, and so permitting free removal of the discharge.

The application of compression to the fistulæ has been tried several times, and success has been claimed for it in two or three cases; in one of which, all ordinary means having failed, a cure was obtained by making the patient apply firmly to the perineum an india-rubber ball, inflated with air, on every occasion before making water, and for some minutes afterwards. This plan was studiously followed during fifteen days, when the opening had soundly cicatrized. Four months after, the patient was perfectly well.

The cure of obstinate urinary fistula has also been attempted by introducing a catheter, and permitting it to remain in the urethra for days together, on the principle of insuring, as it has been supposed, the passage of the urine through the instrument, and thus preserving from irritation the fistulous passages. Little, however, is thus gained; for experience shows that, however large the instrument may be, and however closely it may fit the urethra at the present moment, before thirty-six hours have elapsed it will lie loosely in the canal, and urine will pass by its side. It is not possible, indeed, to remove urine from the bladder for any lengthened period by this means without inducing suppuration in the urethra, which is a bar to success.

It is better to withdraw all the patient's urine, by introducing a catheter three or four times a day, or more frequently if necessary. When the patient can do this cleverly for himself, and thus insure, at every want to pass urine during a period of several weeks, that it is carefully removed without contact with the urethra, a most successful result may be hoped for. I have had an instance of this under my own care where a large portion of the floor of the urethra being lost, the opening closed after three or four months' attention to this practice.

Free incisions through the fistulæ, down to their origin in the urethra, or nearly so, have been found successful in inducing a healthy process of granulation from the bottom of the wound, and thus in ultimately closing the unnatural passages; provided always, however, that there is no obstruction to the free egress of the urine by the urethra, otherwise no such measures can be of any service. In some cases in which external division of the stricture on a grooved staff is indicated, this operation may be performed in such a manner as to include the fistulous opening in the incision, in which case a successful result may generally be reckoned on. Old chronic perineal fistulæ are sometimes better dealt with by the galvanic cautery than by any other method. Another obstinate species of fistulous passage, communicating with the prostatic urethra, sometimes follows the operation of lithotomy; this also may be often successfully treated by the introduction of an iron wire heated to intensity; the best means of effecting which is undoubtedly the galvanic current, since it maintains as well as produces the required temperature.

Fistula is not necessarily a continuous passage from the urethra to the surface, opening from the urethra at one end, it may have a blind or cæcal extremity: hence blind urinary fistula has been described. A small tumor, originally formed by a collection of matter, and having a communication with the urethra, constitutes the general form. Its origin has been variously accounted for ; some believing it a result of stricture, others of inflammation of the mucous follicles of the urethra. Until the tumor is opened externally, it will not disappear, when it becomes a fistula of the ordinary kind, requiring treatment already indicated.—SIR H. THOMPSON.

FISTULA, Vesico-Intestinal.—Fistulous openings sometimes form between the bladder and some portion of the intestinal canal. The result is, that some of the liquids from this latter source enter, at first in minute quantity, and give rise usually to much irritability of the bladder, and other symptoms of sub-acute cystitis. These are sometimes the earliest signs of the existence of an abnormal communication. If the urine is examined at this early period, fragments of vegetable and of animal fibre may be discovered under the microscope. I have myself been able to diagnose at an early stage, in otherwise doubtful circumstances, the existence of vesico-intestinal fistula by this means. Usually the symptoms become gradually more severe, and the fæcal odor and color are communicated to the urine. At length considerable fragments of fæcal matter enter the viscus, become partially dissolved there, and pass through the urethra. I have seen several cases of this distressing condition, both in the male and in the female, but chiefly in the former ; and in these, carcinomatous disease in the abdomen has been the most frequent but not the only cause. Thus, adhesion may take place between an ulcerating bowel and the bladder ; and the ulceration may extend into the latter; no cancerous disease being present.

Treatment.—Little can be said in relation to this matter. The lesion having been determined, instrumental interference is—except under special necessity, such as for the purpose of removing foreign bodies from the bladder, which are a source of great misery—to be shunned. The use of purgatives is also to be avoided; but the bowels should be maintained, as far as possible, in the natural condition. The food is to be such as will nourish the body without producing a large and coarse residue of fæcal matter. In one case under my own care, in which a gentleman passed for several months the whole of the fæces by the urethra, a great amount of suffering was occasioned by swallowing indigestible substances, like grape-stones and husks. Subsequently, by a careful selection of fluid nutriment, the most painful features of the case were much ameliorated. Now and then washing out the bladder with small quantities of tepid water gently thrown in contributed to the patient's comfort. In this case the ulceration was not due to cancer.

For some of these cases of non-malignant disease another form of treatment remains. When it can be determined that the fistulous passage connects the bladder with the rectum, or with the sigmoid flexure of the colon, the propriety of opening the descending colon [Amussat's operation] ought to be considered. In one case, recorded in the *Medical and Chirurgical Transactions*, vol. xxxiii., Mr. Pennell, of Rio Janeiro, performed this operation with success, diverting the passage of fæces from the bladder by the artificial anus. More lately Mr. Holmes has achieved a similar success in a case in which the fistula was believed to exist low down in the colon. It is reported in the same *Transactions*, vol. xlix., pp. 66 *et. seq.* The point to be determined, if possible, before operating, is whether the communication exists between the small or the large intestine or rectum, and the bladder. If it is in the descending colon or below, urine will probably issue at some time or another per rectum; if the small intestine is the seat of ulceration and opens into the bladder, no urine can be expected to issue by the bowel. In favorable cases then, this proceeding should certainly be adopted.—SIR H. THOMPSON.

FEMUR, Fracture of—*See Fractures.*

FIBULA, Fracture of—*See Fractures.*

FLAT-FOOT.—*Causes.*—Prolonged standing or excessive walking in persons of weak and relaxed fibre, synovitis of ankle, injury to ankle, gonorrhœal rheumatism of ankle, genu valgum.

Pathology.—The ligaments which brace up the arch of the instep are lengthened, the head of the astragalus sinks through relaxation of the calcaneo-scaphoid ligament and the scaphoid tuberosity projects excessively; in bad cases the metatarsus is turned more or less outwards, and the outer edge of the foot turned upwards by the peronei; ankle bends inwards, hence the name talipes valgus.

Treatment.—Steel spring or india-rubber pad under arch of foot; the former being let into sole of boot; internal upright bar to support inner ankle; bad cases of talipes valgus require a horizontal bar for the attachment of straps to correct abduction of metatarsus. Even division of peronei occasionally required. Always strengthen general health; avoid standing; exercise systematically flexor muscles. Mr. Willett and myself have succeeded in nine cases out of ten at least, merely by judicious exercise of the leg muscles (Evans's plan) combined with an india-rubber bandage properly applied to the instep and ankle.—C. B. KEETLEY

FŒTATION, Extra-Uterine.—*Definition.*—Growth of the ovum outside the uterus. It may be in the oviduct, or in the embrace of the fimbriated extremity of the oviduct; or so-called abdominal. In the latter case the ovum has probably at some time been attached to some portion of the extremity of the oviduct, and by growth has become dissociated from it.

Causes.—Impregnation of the ovum before it has reached the uterus, with arrest of its passage in some portion of the preuterine tract.

Symptoms.—Those of pregnancy, with pain on the side to which the ovum is attached.

Signs.—Abdominal swelling lateral. As pregnancy advances, child is felt in thin subjects too superficially. Occasional metrorrhagia. Vaginal examination reveals the uterus only slightly enlarged from the presence of the decidua. In tubal pregnancy a swelling is detected in one or other lateral cul-de-sac, unlike any other, viz., as a cyst containing a body floating in fluid. Bimanual examination reveals such tumor more or less movable; the uterus is felt to be movable, and its cavity is found to be scarcely more than three inches long. Examination per rectum may make the diagnosis easier.

Diagnosis.—Often very difficult. From ovarian tumor by the history of pregnancy, though it must be borne in mind that ovarian tumor may exist coincident with uterine pregnancy; from fibro-cystic disease of the uterus by the uterus being movable in the latter case by pressure on the abdominal tumor; by the history and duration of the swelling.

Prognosis.—Unfavorable.

Treatment.—If tubal pregnancy is detected early, the liquor amnii should be evacuated. As it is at all times important to save the child, if it be not at obvious risk to the mother, when the child is viable it should be removed by abdominal section. In this operation it should be borne in mind that the placenta is not to be withdrawn, because of the severe and fatal hæmorrhage that follows the attempt, owing to the containing walls of the ovum not being able to contract on the removal of the placenta. If left to nature, an extrauterine fœtus may be retained for years without producing much inconvenience, or after a certain time the mass may break up and the disorganized fœtus be discharged piecemeal per rectum or per vaginam.—HEYWOOD SMITH.

FOLLICULAR HYPERÆMIA is a common accompaniment of many diseases, and particularly of those attended by pruritus, for in these it is readily excited by scratching, as in scabies, eczema, and phthiriasis. It gives rise to red papules, which are seen to be seated at the hair follicles in part, and partly to be hyperæmic papillæ. This condition is erroneously styled lichen. Hyperæmia of the follicles demands soothing remedies.

There is, further, a condition of follicular hyperæmia met with in adults, though but rarely. In this eruption the surface is uniformly dotted over with red points, every follicle being affected, but the papules are not very prominent, and have no central plug. They are almost completely removable by pressure. The skin of the trunk, and arms, and thighs are usually affected. The disease is chronic, itchy, very obstinate, and occurs in debilitated persons who have been a good deal worried and subjected to anxiety. The disease seems due to vaso-motor disturbances of the follicles, and more nearly allied to lichen ruber perhaps than any other disease.—*Epitome of Skin Diseases.—T. Fox & T. C. Fox.*

FOOT, Dislocation of—*See Dislocations.*

FRACTURE, Varieties.—The main peculiarities of fractures are expressed by the terms,—complete, incomplete, simple, compound; impacted. Complete fractures classified into transverse, oblique, longitudinal, dentate, multiple, and comminuted. Incomplete include fissure, infraction, splintering, perforation. The usual name for infraction is green-stick fracture. Lastly may be added separation of an epiphysis.

Causes.—Predisposing: 1, an exposed situation, *e. g.*, that of ossa nasi; 2, bones of right side break oftener than those of left; 3, rough occupations of male sex; 4, adult age—bones of children are soft and less brittle; 5, rickets; 6, osteomalacia; 7, absorption of part of thickness of bone by ulceration or abscess or tumor. Exciting causes are either: 1, direct, or 2, indirect violence, or 3, muscular action.

Symptoms.—1; Pain; 2, swelling; 3, ecchymosis; 4, crack felt or heard by patient when fracture occurs; 5, abnormal mobility; 6, displacement; 7, crepitus; 8, loss of function ("paralysis") of the limb; 9, injury to neighboring soft parts, *e. g.*, compression of the brain by fracture of the skull; 8 and 9 are classed together as "rational" symptoms, the rest being called "sensual." Abnormal mobility is the only pathognomonic sign. One or more of the above list may be absent, *e. g.*, an impacted fracture presents neither crepitus nor abnormal mobility. Swelling is due to extravasation of blood at first, and afterwards often to œdema and slight inflammation. Displacements are of several kinds viz:—angular, transverse, longitudinal, and rotatory. In longitudinal displacement the fragments usually overlap and thus cause shortening. In rare cases they are pulled asunder; thus, lengthening, of course, results. A good example of rotatory displacement is that which causes eversion of the foot in fracture of the neck of the femur. Besides impaction, displacement of the fragments or intervening blood may prevent crepitus. The soft crepitation caused by effusion, especially those into tendinous sheaths, also the grating of certain rheumatic affections must not be mistaken for crepitus.

Diagnosis is rarely difficult except when only one of two mutually supporting bones is broken, or when there is impaction. In the former case there is little or no deformity, in the latter no crepitus or increased mobility. Careful measurement, inspection or palpation usually settle the question.

Prognosis.—Simple fractures, when properly treated, almost always recover without deformity. In some bones, *e. g.*, the clavicle, slight deformity is to be expected. Compound fractures are liable to numerous serious and sometimes fatal complications. The chief of these are: 1. decomposition in the wound; 2, extensive gangrene of crushed or dead parts; 3, progressive suppuration; 4, accompanying protracted, exhausting fever; 5, erysipelas; 6, septicæmia; 7, pyæmia; 8, tetanus; 9, delirium tremens. The prognosis of a compound fracture may be to a great extent inferred from what will be written about the question of amputation. Occasionally a fracture resists all ordinary means employed to procure union.—"ununited fracture."

UNION IN FRACTURE.—In this first week the surrounding soft parts are found swollen and the seat of inflammatory effusion. More or less blood is extravasated about the fracture and in the medullary cavity at the same point. Amount of escaped blood very variable. During the third week the corpuscles or leucocytes which crowd the effusion, produce either fibrous tissue or cartilage. Later still, soft young bone appears in—1, the medullary cavity; 2, beneath the periosteum; 3, outside the periosteum in the periphery of the fibrous or cartilaginous swelling round the ends of the bones (which swelling is called "callus"). A new periosteum forms outside the callus. The bony callus consists entirely of spongy substance. Subsequently the medullary cavity is restored, the excess of new bony uniting material removed, and that which remains gradually becomes compact and hard. When firmly and steadily set and supported, fractures unite directly, new bone only being formed between and not around the fragments. In other words, there is then no "provisional callus." Very little callus in flat bones; very little external, but a good deal of internal (*i. e.*,) inside the spongy spaces),in spongy bones. The new ossification is usually in fibrous tissues in adults, but is preceded by cartilage in children. The cells which are the agents of the process escape from the blood-vessels. Complete ossific union requires a period of one to two months. Restoration of the medullary canal and absorption of the external or provisional callus requires four or five months more. Union in compound fractures results from organization and ossification of granulations which grow from the ends of the bones and from the neighboring periosteum. The process is essentially the same as that of union of simple fractures. Frequently the ends of the fragments die, and then the sequestra are cast off by the growth beneath them of granulations which absorb the hard parts of the adjacent living bone. Granulations possibly dissolve the lime-salts of bone by developing lactic acid. Many compound fractures have the external wound healed so rapidly, that they really unite just like simple fractures. A bare piece of bone does not usually begin to granulate till about 8–10th day. In meantime, it is of a yellow color. Dead bone is white or gray or blackish. Compound fractures require for uniting three times as long as simple fractures.

DELAYED UNION AND NON-UNION OF FRACTURES.—Occurs naturally in some situations, as in intracapsular fracture of neck of femur, ditto of neck of humerus, fracture of olecranon, and of patella. *Causes.*—Predisposing: 1, bad nutrition; 2, debility from repeated hæmorrhage; 3, specific diseases of blood, *e. g.*, scurvy, the continued fevers; 4, cancerous cachexia; 5, osteomalacia. Local causes are: 1, too loose a dressing; 2, too large a gap of bone to fill up, perhaps owing to loss of a large portion; 3, too early motion. Too loose a dressing, and repeated meddling with and disturbing a fracture, are by far the commonest causes. In ununited fracture, as the condition is called, there is usually fibrous union, sometimes a new synovial membrane and actual false "joint." It is rare for there to be no union at all between the fragments.

Treatment of Simple Fracture.—Three main indications: 1, reduction or setting; 2, keeping in proper position till firm union has taken place; 3, prevention or treatment of complications. Setting: extension, counter-extension, manipulation, relaxation of muscles by flexion of joints or by anæsthesia, occasional propriety of dividing tendons. Compound fractures with protrusion may require skin wound to be enlarged or end of projecting fragment to be sawn off. Apparatus: Two kinds, "fixed" and "movable." The "fixed" are such as plaister of Paris, starch bandage, gum and chalk, moulded mill-board, gutta-percha, poro-plastic, leather, Hyde's felt, &c. The "movable" are the ordinary fracture-box, Cline's splints, Liston's splint, M'Intyre's splint, &c. The difference in the two varieties consists in this—the "fixed" apparatus is moulded specially to the individual case to which it is applied, while the "movable" splints can be adapted by fitting and padding to various successive cases. Some of the so-called "fixed" are not less movable than the other class. To all these may be added the inclined plane, extension by weights or elastic bands, support by sand-bags, &c. Great difference of opinion as to relative value of the above apparatus. Many English, and more Continental surgeons apply a solid firm dressing, such as the starched bandage and mill-board, as soon as possible after the occurrence of a simple fracture, and after most compound fractures too. Other English surgeons teach that this is dangerous. In applying such a firm dressing, attend strictly to the following rules: 1, place no bandage next the skin; 2, line thickly with cotton wool or wadding; 3, include the joints both above and below the fracture; 4, leave the toes or fingers bare, and never fail to examine them carefully twenty-four hours after applying apparatus. Indications for cutting up apparatus wholly or partially are: severe pain anywhere beneath it; signs of obstructed circulation in toes or fingers, or looseness of the apparatus. Starched bandages tend to loosen and require trimming. In adjusting any fracture-apparatus, carefully avoid disturbing fracture. Starched bandage requires twenty-four hours to dry, plaister of Paris takes a quarter of an hour to set; borax will retard, and common salt hasten, setting of latter. Leather, poro-plastic, and mill-board are softened in hot water before moulding. Starch should be applied with palm of hand after bandage has been put on dry. Leather and gutta-percha are better adapted to angular parts, *e. g.*, shoulder, than is mill-board; but gutta-percha is rather dear, and leather very dear. Salter's swing. Cradle to keep off bed-clothes. With the use of a fracture-box or Cline's splints, correct position is obtained by pads of lint or cotton wool. For time of each application, *vide* Special Fractures. Itching of skin is relieved by cleanliness, olive oil, &c. Severe pain may require morphia subcutaneously; but it is usually a sign that apparatus requires readjusting. Pain should never be neglected.

COMPOUND FRACTURES.—*Special Notes on their Treatment.*—Question of amputation. Consider, 1, cause of the fracture (was there much crushing or twisting force?); 2, main arteries or veins torn? 3, amount of hemorrhage; 4, condition as to collapse, reaction, &c. Depth and extent of bone-injury should also be considered. Injury to nerves, even large ones, not of much account. Rupture of large artery not an absolute indication for amputation. Will the limb be useful, even if patient does recover, or will it be in the way?

Always treat the wound in a compound fracture very gently. After first dressing and cleaning, never probe or touch it if possible till the wound is quite fistulous. Then, if necrosis is found, treat it like necrosis from osteitis. A firm starched or plaistered bandage, applied as soon as possible after accident, is the treatment. It should be thickly lined with cotton wadding. Dress the wounds either by Lister's strict plan or with oakum. Extensive discharge or large wounds may require a fracture-box, interrupted or not. Generally, windows in a plaister bandage suffice. Attend to complications as they arise. "Immersion treatment."

Treatment of Ununited Fracture.—1, Rubbing fragments together; 2, blisters or iodine externally; 3, firing neighboring skin; 4, acupuncture needles left for a few days in a false joint; 5, electro-puncture; 6, seton; 7, scraping ends of fragments with a tenotomy knife; 8, excision of ends of fragments; 9, scraping back periosteum and then excising; 10, sutures; 11, driving in ivory pegs; 12, metal screws. But, in many cases, the prolonged application and skilful management of a plaister bandage are sufficient. Attend to general health. Give phosphates.

FRACTURES UNITED WITH DEFORMITY.—*Treatment.*—If there is malposition in a compound fracture, and the wound is healing rapidly, do not try to rectify till the wound is healed. Remedies for obliquity are bandaging, extension by weights, manipulation, re-breaking (by flexion or extension), cutting operations. Two cutting operations: 1, subcutaneous osteotomy. Small incision down to bone. Gimlet-hole through bone. Insert keyhole saw, and saw partially through, first one side, then the other. Lastly, break the bone in two. 2. Antiseptic osteotomy. Of course bloody operations are dangerous, but the danger is very small with antiseptic treatment.

SPECIAL FRACTURES.—*Acetabulum, Fracture of.*—*Causes.*—Great violence applied to femur. *Varieties.*—Two. *Firstly*, fracture of rim of acetabulum; crepitus, dislocation of femur, probably easy to reduce, but very difficult to keep in position. *Secondly*, fracture through bottom of acetabulum. Head of femur may be driven through acetabulum into pelvis, and even impacted. And there are, very likely, severe injuries to neighboring parts. *Treatment.*—Extension; rest; long splint, weight or fixed apparatus. *Prognosis.*—Shortening of limb may be expected.

ACROMION, FRACTURE OF.—*Signs.*—Flattening of shoulder; inability, entire or partial, to raise arm; crepitus; arm feels to patient as if dropping off; the fragments can be separated. *Prognosis.*—Union is not unlikely to be ligamentous. *Treatment.*—Support elbow well, so as to make use of head of humerus for a splint. Fix the arm as firmly as can be done without binding it too closely to the side.

CLAVICLE, FRACTURE OF.—*Causes.*—Almost always indirect violence, *e.g.*, falls on the shoulder. *Situation.*—1 (most common), great concavity; 2, acromial end, between or external to coraco-clavicular ligaments; 3, sternal end (inside rhomboid ligament very rare). *Character.*—Oblique, when from indirect violence in adults; transverse in children; transverse or comminuted from direct violence. *Displacement.*—1, Fracture in middle of bone—outer fragment downwards and inwards beneath inner fragment, the acromial end being rotated forwards; 2, fracture of acromial end outside coraco-acromial ligaments—outer fragments strongly forwards, inwards, and slightly downwards. Fracture between conoid and trapezoid; deformity almost nil, or else as in last variety (Gordon); 3, fracture of sternal end inside rhomboid ligament—outer fragment horizontally forwards, simulating dislocation.

Additional Symptoms.—Flattening of shoulder, prominence of inner fragment, crepitus, inability to raise arm, tenderness. *Complications.*—Occasional injury to subclavian vein or brachial plexus. *Treatment.*—Three indications: 1, keep shoulder and scapular fragment outwards: 2, correct rotation forwards of shoulder; 3, elevate shoulders. Best results from recumbent, supine position, for two or three weeks. Bandages, pads. Many special apparatus.

COCCYX, FRACTURE OF.—*Causes.*—Parturition, falls and blows. *Treatment.*—Regulate bowels. Rest.

COLLES' FRACTURE.—See Fracture of Radius.

CORACOID PROCESS, FRACTURE OF.—*Causes.*—Blows; dislocation of humerus. *Prognosis.*—Ligamentous union to be expected, it is said. *Treatment.*—Rest. Biceps and coraco-brachialis to be relaxed by flexing elbow and bringing arm across front of chest. Uncomplicated fracture of coracoid process is extremely rare.

FACIAL BONES, FRACTURE OF.—*Cause.*—Direct violence. *Prognosis.*—Almost equally good in both compound and simple fractures. Great deformity sometimes unavoidable. *Treatment.*—See Fracture of Nasal Bones, etc.

FEMUR, FRACTURE OF.—Three main divisions: 1, of upper extremity; 2, of shaft; 3, of lower extremity. 1, Fracture of upper extremity, three subdivisons, viz.; *a*, intracapsular fracture of neck of femur; *b*, extracapsular fracture of neck of femur; *c*, fracture of the trochanters not involving the neck.

FRACTURE, INTRACAPSULUR OF NECK OF FFMUR.—Fracture altogether within capsule of hip-joint. *Causes.*—Predisposing—old age, consequent senile atrophy and lessened obliquity of neck of femur. Exciting cause, very trifling, *e.g.*, slight fall, or even turning in bed. Almost all intracapsular fractures occur in old age. More common in female sex. *Signs.*—1, loss of power; limb cannot be raised from the bed (except in rare cases); 2, flattening in region of trochanter; 3, trochanter rises above Nélaton's line; 4, it moves, on rotation, in an arc of a circle smaller than on the sound side; 5, crepitus; 6, tenderness; 7, eversion (except in rare cases); 8, shortening, one-half to 1 inch at first, later on, owing to capsule giving way, sometimes 2 and a-half inches. *Pathology.*—Lower fragment usually outside upper. Very little extravasation. *Union.*—By fibrous tissue. Sometimes *nil*, rarely osseous. *Diagnosis.*—See Extra-capsular Fracture. *Prognosis.*—The unavoidable confinement to bed in some cases depresses th system fatally. In any case lameness and shortening are to be expected. *Treatment.*—Bed for two or three weeks. Pillows beneath knee. Then leather or poro-plastic splint to hip; crutches and gentle attempts to use. In strong constitutions, attempt to obtain firmer union by longer rest and use of starch bandage. Good diet. Water bed.

FRACTURE, EXTRACAPSULAR OF NECK OF FEMUR.—Two kinds: 1, Simple; 2, Impacted. Fracture wholly or partially outside capsule of joint. *Cause.*—Direct and considerable violence. *Signs.*—Firstly, when not impacted—1, inability to raise limb; 2, bruising and swelling of hip, indicating great extravasation; 3, crepitus at great trochanter, which may sometimes be distinctly felt to be in several pieces; 4, great pain and tenderness; 5, usually very marked eversion, sometimes inversion; 6, shortening, one and a-quarter to two and a-half or even three and a-half inches. Secondly, impacted fracture. Symptoms less marked than if there is no impaction. Less eversion; little or no crepitus, only slight shortening, not more than an inch. But there is local tenderness, followed in a day or two by thickening over great trochanter. *Treatment.*—Extracapsular fracture is to be treated on similar principles to those applied in treatment of fractured shaft of femur. Seek for union by securing immobility with Liston's splint, &c. Compress trochanter with a belt round hips.

FRACTURE OF TROCHANTER MAJOR.—SIGNS.—Local pain, tenderness, crepitus, eversion, no shortening. Fracture of this without fracture of neck or shaft of femur almost unknown.

FRACTURE OF SHAFT OF FEMUR.—Classified according to position, whether in upper, middle, or lower third. *Signs.*—Typical signs of fracture. *Displacement.*—In upper and middle thirds, the upper fragment inclines forwards and usually outwards, lower fragment inclines inwards and is rotated outwards. Causes of the displacement are: 1, muscular action of psoas iliacus, adductors, &c.; 2, lower fragment forces upper fragment outwards at time of accident. *Treatment.*—1, position merely; 2, Liston's splint; 3, double inclined plane; 4, extension by a weight; 5, anterior splint; 6, starched bandage or other fixed apparatus. 1. Position. Lay limb on outer side, with knee bent. In infants, merely lay limb straight out in bed, taking weight of clothes off with a cradle (preserve body-warmth in latter case). 2. Liston's splint,—Length, it should reach from hand's length below heel to a hand's breadth below axilla. Pad ankle well. Turn bandage twice round ankle and instep, then fix foot to splint. Avoid crushing the small toes. Bandage to just above knee with figures of eight. "Kettle-holder" on inner aspect of thigh. Perineal band. Extension and setting. Apparatus for combining Liston's splint with continuous extension by elastic bands or by weight and pulleys. Sandbags. Bottom of bed should be level. 3. Double inclined plane. 4. Extension by weight.—Stirrup of wood and plaster. Strapping extending up to knee. Bandage over strapping. Raise foot of bed on blocks. Weight consists usually of sandbags or tins of shot, 5 to 10 lbs. 5. Anterior iron splint.—May be combined with a plaster splint. 6. "Fixed" apparatus. Plaster of Paris, starch bandage, &c. Unless attended to with great vigilance, liable to have very bad results in fractured thigh. The hip should be thoroughly fixed—not an easy matter. Fracture of Femur, lower third, that is, near knee-joint. Upper end of lower fragment projects backward. Hence these cases should be treated with the knee semi-fixed.

COMPOUND FRACTURE OF FEMUR.—Very dangerous. But amputation for it is extremely fatal. Treat each case according to its own peculiarities.

FIBULA, FRACTURE OF.—Tibia acts as a splint, making diagnosis difficult. Seek for crepitus and increased mobility by pressing fibula at different points against the tibia. Occurrence frequent.—*Treatment.*—Cline's (side) splints, or some immovable apparatus. Fracture of fibula about two or three inches above ankle, with rupture of internal lateral ligament and dislocation of foot outwards is called "Pott's Fracture,"—See Dislocation of Ankle.

FRACTURE OF FOREARM may be on radius or ulna separately, or of both bones. See Fracture of Radius, Ulna, &c.

HUMERUS, FRACTURE OF.—9 kinds, viz: 4 of the upper end, 1 of the shaft and 4 of the lower end.

INTRA-CAPSULAR OF NECK OF HUMERUS (anatomical neck of course). *Cause.*—Direct violence. *Signs.*—Those of a severe injury to the shoulder-joint, causing paralysis, swelling, &c., but very little shortening (1-3 inch) or deformity. Indeed, this fracture is diagnosed by the absence of the marked symptoms of other fractures and of dislocation. Often impacted. When not impacted, there is crepitus. *Prognosis.*—Except bony uniform, with, very likely, excess of new bone. *Treatment.*—Pad in axilla leather shoulder-cap, bandage and sling. Whole arm should be bandaged gently and evenly. Sling should support hand rather than elbow in all fractures of humerus. Impacted fractures not to be disturbed.

Extra-capsular Fracture of Neck of Humerus., *i.e.*, through *surgical* neck. *Signs.*—Sharp end of lower fragment projects into axilla or beneath coracoid. But head of humerus remains in glenoid cavity. Distinct crepitus. Shortening—1 inch. Pain from irritation of brachial plexus. *Prognosis.*—In rare cases the bone atrophies. *Treatment.*—Bandage limb from finger upwards. Pad in axilla. Carry elbow forwards and inwards. Apply a leather cap to shoulder and outer side of upper arm. Support hand but not elbow with a sling. Erichsen's bent leather splint.

Separation of Upper Epiphysis of Humerus resembles accident last described, but the upper end of the shaft forms a remarkable and smooth projection beneath the coracoid process. The patient is usually very young, and must be less than twenty. *Treat* like fracture of surgical neck.

Fracture of Great Tuberosity.—*Cause.*—Direct violence. *Signs.*—Increased breadth of shoulder. The tuberosity is dragged backwards by the muscles inserted into it, and the head of the humerus forwards beneath the coracoid (a semi-dislocation) by the pectoralis major, &c. Crepitus. *Treatment.*—Pad in axilla and leather cap on shoulders, or rest in bed with the arm extended.

Fracture of Shaft of Humerus.—*Causes.*—Direct violence, falls upon the elbow, and, not rarely as compared with other bones, muscular action. *Signs.*—Typical. *Treatment.*—Two or three splints, one being an angular elbow-splint. Support hand but not elbow in a sling. Stromeyer's cushion for compound fracture of humerus. *Vide* Bryant's *Surgery*, p. 942. Danger of delayed union in fracture of shaft of humerus.

Fracture of Lower End of Humerus.—4 kinds:—1, Transverse fracture; 2, fracture of either condyle; 3, fracture between the condyles into the joint (this is always combined with transverse fracture); 4, separation of the epiphysis. *Causes.*—Usually, falls on the bent elbow. *Signs.*—1, of *transverse fracture.* It may be either above or below the condyles. The symptoms are given in the following diagnosis between it and the injury with which it is most frequently confounded, viz., dislocation of radius and ulna backwards.

The Fracture.	The Dislocation.
1. Crepitus.	1. No crepitus.
2. Easily reduced, but deformity at once reappears.	2. Not so easily reduced. But then does not reappear.
3. Prominence of lower end of upper fragment of humerus projects forward *above* the bend of the skin in front of the elbow-joint.	3. Prominence of lower articular surface of humerus projects forward *beneath* the bend of the skin in front of the elbow-joint.
4. Internal condyle in normal relation to olecranon.	4. Distance increased between internal condyle and olecranon.

2. Signs of fracture of condyles. Pain. Crepitus produced by direct manipulation, and by pronation and supination of forearm.

3. Signs of fracture between condyles into joints. Pain. Crepitus. Effusion into joint perhaps considerable. The pathognomonic sign is the increased breadth from condyle to condyle.

Signs of separation of epiphysis. Like those of transverse fracture; but the crepitus is softer, and the patient is necessarily young. In every obscure case of injury to the elbow, makes the patient place his hands one above the other upon his head, then bring his elbows together and compare them, using your eyes and fingers. *Treatment* of fractures of lower end of humerus. Reduce and put up in lateral angular slints, with elbow at right angles and hand in sling. When elbow tends to displacement backwards, apply angular splint behind, and a short splint in front of humerus. Passive motion in 3 weeks—in one week if the fracture extends into the joint. *Complication* of fracture of humerus,—injury of musculo-spiral nerve. See Injuries of Nerve.

HYOID BONE, FRACTURE OF.—*Causes.*—Direct violence; rarely muscular action. *Signs.*—Crepitus, &c., with difficulty in swallowing, speaking, and sometimes even in breathing. Reduce with one finger in patient's mouth.

JAW, LOWER, FRACTURE OF.—*Cause.*—Great and direct violence. *Situation.*—Order of frequency,—near canine tooth, at angle, at symphysis. Neck of condyle and coronoid process are very unusual places. Occasionally multiple. *Signs.*—Pain, tenderness, mouth can scarcely be opened, saliva dribbles, crepitus, deformity; frequently bleeding, for the fracture often opens through the mucous membrane of the mouth. *Prognosis.*—Union often slow. *Treatment.*—The interdental splint cannot be too strongly recommended. It should almost always be used. See that no tooth or foreign body lies between the fragments, if the fracture is an open one. (*See* Lyons, *St. Barth's Hosp. Rep.* 1879.) Wire round teeth damages them. Thomas drills the fragments and inserts a silver suture.

LEG FRACTURE OF.—See Fracture of Tibia and Fibula.

METACARPUS } FRACTURE OF.—*Causes.*—Direct violence. *Treatment.*
METATARSUS }
—On general principles.

NASAL BONES, FRACTURE OF.—Occasional emphysema from coincident injury to frontal sinuses. Difficulty in reduction and in preventing deformity. A smooth silver female catheter may be inserted into the nostrils and used to raise the depressed bone. Adams' and Gamgee's apparatus for preserving the position of the bones. Vulcanized india-rubber dilator introduced empty and then filled with water has great power to raise a flattened nose. Above remarks apply both to fracture of nasal bones and of septum.

PATELLA, FRACTURE OF.—Two kinds, one transverse and usually the result of muscular action, or muscular action combined with violence; the other stellate, Y-shaped, or, perhaps, quite simple, but not transverse, and always caused by direct violence. The former fracture often occurs in missing a step whilst walking down stairs, or in some similar and trivial manner. In it the fragments generally separate widely, while in the stellate fracture there may be little or no separation. Consequently the former always ends in fibrous union, the latter frequently in bony union. Sulcus between fragments in the transverse fracture. Great swelling and effusion into knee-joint. Inability to attend knee. *Treatment.*—Rest in horizontal position or with heel raised. Straight splint along back of limb. Elastic straps to pull upper fragment downwards and lower upwards. Figure-of-8 bandage. Callender's arrangement of weight, strapping, and pulleys. Malgaigne's hooks. Malgaigne's hooks fixed into plaster after Spence's plan. No doubt one of the chief indications is to reduce the effusion into the knee-joint without delay. It has been recommended to do this with the aspirator; but it can be effected to a great extent by bandaging and compressing, using plenty of cotton wool. Hence a starch and mill-board apparatus is useful.

COMPOUND FRACTURE OF PATELLA.—Very serious indeed, but not always requiring amputation.

PELVIS, FRACTURES OF, may occur in part or parts of the os innominatum, but, for practical purposes, are best classified into those which injure a large part of the bone, *e. g.*, the body or rami of the pubes, and those which merely chip off a prominence like the ant. sup. spine of the ilium. The former are very serious, from the violence often done to the pelvic viscera, especially the bladder. *Cause.*—Usually a vehicle passing over the part. *Signs.*—Crepitus, pain (inability to stand in the first or serious class of cases). Often signs of ruptured bladder, urethra, or rectum. *Treatment.*—Pass a catheter to examine the state of the bladder. Rest in bed. Bandage round hips and knees. Sometimes displaced parts may be set by manipulating with the finger in the vagina or rectum. See also Fracture of Acetabulum, Rupture of Bladder, &c.

RADIUS, FRACTURES OF.—1, of head; 2, of neck; 3, of shaft; 4, of lower extremity. The first three are caused usually by direct violence, and present usual signs of fracture, viz.: crepitus, pain, &c. Unless the ulna is broken also, there is little deformity. *Treatment.*—For first three cases: An angular splint to fix elbow and extend along back of forearm. Forearm midway between pronation and supination. Short splint along palmar surface of forearm. Splints should be flat and wide, so as to prevent bandage from squeezing the radius and ulna together. Fingers to be left free. The fourth case, viz., fracture of lower end of radius, is called

COLLES' FRACTURE.—*Causes.*—Falls on outstretched hand. Very rarely direct violence. Especially frequent in old women. *Signs.*—Peculiar spoon-shaped deformity. Prominence of styloid process of ulna. Crepitus generally absent, or at least indistinct. Dorsal prominence is nearer the hand than palmar prominence. Pain severe. Power of supination or pronation lost. *Anatomy.*—Upper fragment occasionally impacted into lower; lower sometimes comminuted. Dorsal prominence formed by lower fragment; palmar prominence by flexor tendons stretched over lower end of upper fragment. Position of fracture generally about one inch above carpal articular surface of radius. *Prognosis.*—If the deformity can be removed and the fracture perfectly set at first, all should be well. Otherwise, deformity will be permanent, and stiffness of the wrist and fingers may continue for many months. *Diagnosis.*—From dislocation of the wrist-joint, by the fracture's not altering the distance between the styloid processes and the knuckles. *Treatment.*—Exery effort to be made to reduce and set properly at commencement. Extension and counter-extension. Bruce Clark dissected a specimen in which reduction was easy, if the extensors of the thumb and carpus (radial side) were first relaxed by appropriate movements of the hand and thumb. Apparatus used are of three kinds: First, Nélaton's pistol-shaped splint applied along palmar side separately, or along dorsal side in conjunction with a short splint on palmar side of shaft of radius. Thick dorsal pad opposite lower fragment. Palmar pad thickest in radial border. (The word palmar applies here to the arm only, not the hand). Passive exercise of fingers after second week. Second, long straight posterior and short anterior splint, padded like Nélaton's apparatus. In this case the hand is often left entirely free, so that the fingers may be exercised, and the weight of the hand may keep the radial side of the wrist extended. Third, Gordon's splints. Hand kept in prone position. Two straps. No bandages. Ridge on radial side of palmar splint. "Over-hanging lip" on radial side of lower end of dorsal splint. Gordon says that impaction is uncommon in this fracture. Lower fragments of radius occasionally, but rarely, displaced forwards instead of backwards. Dr. L. S. Pilcher demonstrates that in Colles' fracture the strong periosteum on the back of the radius remains untorn, and is the main obstacle to the reduction of the fracture. To raise it, bend back the hand and wrist. Then make slight extension in the line of the forearm, accompanied by moderate pressure on the dorsum of the lower fragment.

Reduction is thus effected. The only apparatus Pilcher uses are a broad band of adhesive plaster round the seat of fracture, and a sling to support the arm. I can recommend this plan from my own experience.

RADIUS AND ULNA, FRACTURE OF SHAFT OF.—Treat like fracture of either bone singly. Green-stick fracture not uncommon. Splints to be wide, and to be applied whilst hand is supinated.

RIBS, FRACTURE OF.—*Causes.*—Predisposing: old age. Immediate are of three kinds: 1, direct violence; 2, indirect violence, the chest being compressed at one part the rib gives way at another, just as a spring or a stick might; 3, muscular action, as from violent coughing or severe labor. *Situation.*—Usually the convexity of the rib a few inches in front of angle. Middle ribs most frequently broken, first and second ribs rarely, because protected by clavicle. *Signs.*—Catching pain on inspiration or coughing. Tenderness. Crepitus. Crepitus sometimes difficult to get, especially when the fracture is beneath the thick muscles of the back. Press alternately with the fingers of each hand, one on one side, the other on the other side of the supposed fracture. Take care to apply both hands to the same rib. Breathing shallow and abdominal. Other symptoms often arise from complications, *e. g.*, hæmoptysis. *Complications.*—1, Emphysema; 2, pneumothorax; 3. hæmothorax; 4, hæmoptysis; 5, wounds of heart, pericardium, or great vessels; 6, wounds of intercostal vessels; 7, etc., wounds of diaphragm and abdominal viscera, liver, or spleen. 1 and 2 imply a wound of the lung; 4 implies either a wound or bruise of the lung. Emphysema is far the commonest complication. Practically, cases of fractured rib are classified into those without and those with injury to the lungs. Secondary complications are inflammations and empyema. *Diagnosis.*—When crepitus cannot be obtained, consider generally all the symptoms present. *Prognosis.*—If there is no visceral injury, speedy union with formation of provisional callus may be expected. If there is visceral injury, then prognosis depends on its nature and amount. The danger in such cases is threefold: firstly, shock; secondly, hæmorrhage; thirdly, inflammation. *Treatment.*—Broad bandage round chest, prevented from slipping down by braces of bandage across shoulders. Strapping all round chest, or extending merely from spine to sternum over injured side. In some cases, bandaging appears to press the sharp ends of the fragments inwards; it is then, of course, contraindicated. In bad cases, rest in bed for a few days and moderate diet. For treatment of complications, see Hæmorrhage, Injuries of Thorax, Lungs, etc. Treatment lasts a month.

SACRUM, FRACTURE OF.–*Causes.*–Either severe crushing force applied to the whole pelvis or else gun-shot wounds. *Prognosis.*—Very bad. *Treat* each case with its complications on general principles.

SCAPULA, FRACTURE OF.—*Varieties.*—Four, viz., 1, of body ; 2, of neck ; 3, of coracoid process ; 4, of acromion. See Fracture of Acromion and of Coracoid.

FRACTURE OF BODY OF SCAPULA.—*Causes.*—Severe direct violence. *Signs.*—(Often obscure,) pain, loss of power, crepitus, irregularity in spine of scapula if fracture passes through that process. *Treatment.*—Bandage pad over scapula, elbows supported by a sling. *Prognosis.*—Deformity not unlikely.

FRACTURES OF NECK OF SCAPULA.—Two kinds, viz., 1, of anatomical neck, *i. e.* external to coracoid ; 2, of surgical neck, *i. e.*, internal to coracoid process. In fracture of the anatomical neck, the symptoms resemble those of dislocation of the head of the humerus into the axilla ; but the deformity produced by the fracture, though easily reduced, at once recurs, and there is also crepitus. Still, even these points will not distinguish fracture of the anatomical neck of the scapula from dislocation of the humerus with fracture of the glenoid fossa. Fracture of the surgical neck can be recognized by bearing in mind that the coracoid process goes with the separated neck, and is detached from the body of the scapula. All fractures of the neck of the scapula are excessively rare. *Treatment.*—Raise the elbow with a sling, and keep the parts at rest with a pad in the axilla and a bandage round arm and chest.

Sternum, Fracture of.—*Causes.*—Great direct violence: rarely indirect; occasionally, even muscular effort during labor. *Signs.*—Deformity, pain, mobility, &c. Treat like a broken rib.

Tibia, Fracture of.—When the shaft of this bone is broken, the fibula remaining entire, the deformity is almost or quite *nil*, and other symptoms are very mild. Trace ridge of shin carefully with forefinger. Best *treatment*, a plaster case. Separation of upper epiphysis may cause arrest of growth. Fracture of internal malleolus is generally combined with dislocation of foot inwards or outwards, *quod vide*.

Tibia and Fibula, Fracture (Fracture of Leg).—*Commonest situation.*—Junction of middle and lower third. *Causes.*—Violence, direct or indirect, sometimes slight. Rare in children. *Signs.*—Typical and unmistakable. *Deformity.*—Upper fragment projects forwards and upwards in most cases. Tendency to eversion of foot (as in almost all fractures of lower extremity). *Treatment.*—Handle carefully and set at once, because of danger of converting simple into compound fracture, through sharp end of upper fragment piercing skin. Set with great toe in line with inner border of patella, so that recovery may not take place with eversion of foot. Keep straight the line of the anterior border of the tibia. Anæsthetize if necessary. Division of tendo Achillis perhaps required in rare cases. *Apparatus.*—1. Starch bandage and mill-board, plaster of Paris, Bavarian splint, or some other fixed apparatus. See general article on Fractures above. 2. Cline's splints (common lateral ones with foot-pieces). 3. Fracture-box, *i. e.*, two plain side splints with back-piece furnished with foot-board. 4. M'Intyre's splint. 5. When there is much tendency to antero-posterior displacement, laying limb on its outer side, with knee and hip flexed, is often successful. 6. Anterior wire-splint. With most of these apparatus, some form of swing may be advantageously used. Keep foot at right angles to leg. Duration of treatment, usually five weeks before patient's limb may be trusted in a mere light gum and chalk case.

Compound Fracture of Leg.—Two kinds: firstly, when a fragment pierces a moderate wound in skin from within outwards: secondly, when the wound is very large, or when it is produced by severe, crushing, external violence. Practically, most cases can be thus classed, and the latter are much more serious than the former. Do not attempt to what is called "close the wound, and convert it into a simple fracture." If the case is slight enough, you will not be able to prevent it from closing itself, unless you are meddlesome. Support the whole limb by plaster bandaging over a layer of cotton wool, and immediately over the wound and its neighborhood apply oakum to absorb all discharge. Protect skin and wound from iritation of tar in oakum by greasing with zinc ointment. Or use Lister's antiseptic treatment. So-called "open treatment" is scarcely more open as regards the wound than a thick layer of porous and absorptive material like oakum; though, of course, it is open enough to noxious influences floating about the sick room. But it is only just to say that the "open treatment" has had excellent results under Humphry and others. Hæmorrhage can almost always be restrained by pressure. For complications, erysipelas, abscess, pyæmia, &c., see articles on those subjects.

Ulna, Fracture of.—Three kinds.—1, shaft; 2, olecranon; 3, coronoid process. *Shaft.*—Treat like fracture of shaft of radius. *Fracture of Olecranon. Causes.*—Falls on elbow; rarely muscular violence. *Signs.*—*Swelling, ecchymosis, and tenderness.* Fragment drawn up by triceps.

Treatment.—Anterior splint, thickly padded in bend of elbow, so that the limb may be slightly flexed. Passive motion in fifth week. *Result.*—Union often ligamentous. *Fracture of coronoid process.*—Excessively rare. Ulna dislocated backwards from trochlea, easily reduced, but slips back again directly. *Treatment.*—Posterior angular splint, straight splint in front of humerus.—C. B. KEETLEY.

FRECKLES.—Freckles are light or dark brown spots, varying in size from a pin's head to a lentil, occurring on the skin of fair or red-haired people. They are found usually on the more exposed regions of the body, such as the face, neck, and backs of the hands and wrists, but appear also on other parts. They are greatly influenced by light, are always darker in summer than in winter. Some doubt exists whether they can be produced by the sun's rays, but there is reason to believe that many spots otherwise imperceptible are only then visible. Exposure of the limbs to heat will often produce a similar discoloration as the result of a deposit of pigment in the rete. The appearance of the spots is entirely unattended by itching, or indeed any local or constitutional symptom. When the stains are larger, more persistent, and are not influenced by exposure to heat and cold, they are termed lentigines.—MALCOLM MORRIS.

FROST-BITE.—Frost bites vary in degree as much as burns and scalds.

Signs.—In severe cases: tingling, numbness, coldness, stiffness, white or mottled appearance. Reaction is accompanied by inflammatory symptoms, and by gangrene in the severer cases. The gangrene may be either immediate, when it will be of the dry variety, or secondary to the inflammatory symptoms, when it will be moist.

Treatment.—Resembles that of burns; but the greatest care is required in restoring circulation to the frost-bitten part. Cold room, friction with snow, or cold flannel or fur. Stringently avoid hot water, fires, &c. In those cases where persons exposed to cold are overcome with sleep, they should not be suddenly carried into a warm atmosphere. Use friction and gradual warmth.—C. B. KEETLEY.

FURUNCLE—*See Boils.*

GALACTOCELE—*See Breast, Diseases of.*

GALACTORRHŒA.—*Definition.*—(1) A continuous flow of milk from the breast of a nursing woman; or (2) a continuous secretion of milk long after she has ceased to suckle.

Causes.—(1) Insufficient tone of the nipple; (2) morbid stimulation of the gland, or debility.

Symptoms.—(1) Unhindered flow of milk in the intervals of nursing; (2) ability to get milk from the breast on slight pressure.

Signs.—See Symptoms.

Diagnosis—Easy from symptoms.

Prognosis.—Often intractable.

Treatment.—(1) Astringent applications to the nipple, tannic acid lotion, gentle friction; the nipple should be drawn out into a breast-pump from time to time. (2) Application of belladonna to the breast; the breast to be kept cool; iodide of potassium, iron, and other tonics.—HEYWOOD SMITH.

GALL-BLADDER, Diseases of.—The morbid conditions to which the gall-bladder is liable need only be briefly indicated. Most of them cause enlargement of the organ, and it is important to be able to recognize the distinctive clinical characters of each form of enlargement.

1. DISTENSION WITH BILE.—When anything obstructs the common bile-duct, such as a gallstone, the gall-bladder becomes filled with bile, and

may attain enormous dimensions. There will then be the usual signs of obstructive jaundice, with enlargement of the liver, while the gall-bladder is perceptible as a fluctuating tumor, sometimes reaching nearly to the iliac crest, and being generally somewhat tender.

2. Acute Inflammation and Suppuration.—The mucous membrane of the gall-bladder is liable to simple catarrh, or to croupous or diphtheritic inflammation, like other mucous surfaces, but the most important form of acute inflammation is that which is attended with the formation of pus in its interior, which particularly results from irritation of its mucous membrance by gallstones, or from obstruction of the cystic duct by these bodies. The condition is clinically indicated by a very painful and tender fluctuating enlargement of the gall-bladder, which may ultimately assume the characters of an abscess, or may even burst, accompanied with marked rigors and pyrexia, the latter tending to become of a hectic type. The inflammation is often preceded by signs of gallstones, but there is neither jaundice nor hepatic enlargement as a rule.

3. Chronic Inflammation—Hydrops Vesicæ Felleae—Dropsy of the Gall-Bladder.—If the cystic duct is obstructed for a long period, the gall-bladder may become gradually dilated, owing to the accumulation of a clear, serous, or synovial-like fluid the product of unhealthy secretion from the mucous surface, probably partly the result of chronic catarrh, while its walls become much thinned and atrophied. The organ is more or less distended, and often attains extreme size, but there is little or no pain or fever, while jaundice is absent, and the liver is not enlarged. Occasionally the course of events is different. The liquid portion of the contents of the gall-bladder becomes absorbed, leaving an inspissated substance, in which calcareous salts are deposited; the walls undergo thickening and contraction from chronic inflammation; and ultimately a firm puckered mass is left, inclosing a chalky pulp.

4. Accumulation of Gallstones.—Gallstones are often present in the gall-bladder without affording any clinical evidence of their existence. In some instances, however, and especially when they are very numerous and large, they cause local uneasy or painful sensations, which are increased after food, or after much exertion or jolting, as well as reflex disturbance of the stomach and other parts, and sometimes much constitutional discomfort and depression. Occasionally also they give rise to severe symptoms from time to time, by attempting to enter the cystic duct, and subsequently falling back into the gall-bladder. They may further excite inflammation or ulceration of the mucous surface, the latter ending sometimes in perforation or giving rise to pyæmia. In rare instances such a number of calculi collect that they form a tumor, even of considerable size, having the general characters of an enlarged gall-bladder as regards position, shape, and mobility, but presenting the following distinctive characters: 1. The tumor feels hard and sometimes nodulated. 2. On palpation a peculiar sensation is experienced, owing to the rubbing together of the calculi, compared to that produced by grasping nuts or pebbles. 3. A corresponding sound may be heard on auscultation, and occasionally loud rattling is perceptible on shaking or moving the patient. Now and then local peritonitis is excited by this enlargement, so that it becomes adherent and fixed. When such a tumor exists, there are necessarily more marked suggestive sensations, such as weight and uneasiness, especially on moving from side to side. The progress of these cases, as well as the growth of the enlargement, is very slow and gradual.

5. Cancer.—The signs of this rare disease are: 1. Lancinating pains, with much tenderness, in the region of the gall-bladder. 2. A tumor, having more or less of the characters of enlarged gall-bladder, but usually *feeling firm, resistant, irregular, and nodular*, without the peculiar sensa-

tion of gallstones, being adherent and fixed, and growing rapidly. There are always evidences of cancer in other parts, with well-marked cancerous cachexia. A fistulous communication with the intestines is often established.—Gallstones are usually present in the gall-bladder. Jaundice and vomiting are common symptoms.—FREDERICK T. ROBERTS.

GALLSTONES.—*Etiology and Pathology.*—There is considerable uncertainty as to the mode of origin of gallstones. The chief views may be thus stated: 1. That they are merely the result of inspissation and concentration of bile. 2. That they depend upon certain biliary ingredients being in excess, especially cholesterin and coloring matters. 3. That the bile has some abnormal chemical composition, either when first formed or as the consequence of subsequent changes, which prevents it from holding certain elements in solution, and hence they are deposited. Thus calculi have been attributed to deficiency of soda, with excessive acidity of the bile; excess of lime, causing a separation of pigments; decomposition of the salts of soda with the biliary acids; or decomposition of the biliary acids themselves, with consequent precipitation of cholesterin and pigment. 4. That they originate in plugs of mucus, epithelium, or foreign bodies, upon which the ingredients of the bile are afterwards deposited as a nucleus. It is highly probable that each of these views is correct in different cases, and when once the formation of a gallstone has commenced, its increase may be due to some other cause than that which originated it in the first instance. There can be no doubt but that a catarrhal state of the gall-bladder and ducts favors the production of calculi, either by inducing stagnation of bile, or, as some believe, by the mucus then formed favoring decomposition of this secretion, or impregnating it with carbonate of lime. This decomposition has also been attributed by Thudichum to the absorption of some ferment from the intestines.

There are some important predisposing causes of gallstones, viz., advanced age, the female sex, sedentary habits, habitual constipation, over-indulgence in animal food and in stimulants, and organic diseases of the liver, gall-bladder, or bile-ducts, interfering with the escape of bile. Biliary calculi have also been attributed to drinking water containing excess of lime, but on no adequate grounds.

Anatomical Characters.—By far the most frequent original seat of biliary calculi is the gall-bladder, but they may also be found in any portion of the bile-ducts, or even in the liver itself. The number varies from one to hundreds or thousands; usually several are found. There is also a wide range as to size, this being in an inverse ratio to the number; several are sometimes cemented together, so as to form a large concretion. Originally most of the calculi are round or oval, but when numerous, owing to mutual friction, they become worn and angular, presenting flat or concave facets, or occasionally actual articulations. When formed in the ducts they exhibit curious shapes, being branched or coral-like. As a rule gallstones have a brownish or greenish-yellow color, and are opaque; but they present an endless variety of tints, ranging from white to black, blue, green, red, and other colors, according to their composition; occasionally they are somewhat translucent. They frequently have a greasy or saponaceous feel, with a waxy, brittle consistence, being readily cut or crushed; sometimes they are very firm. Most of them sink in water when recent, but some float, and most gallstones will do so after having been dried. The structure is rarely homogeneous and uniform. In the majority of cases, after a calculus has existed for some time, a section reveals distinctly three parts, named from within out—the nucleus, of which there may be more than one; the body, which is often made up of concentric layers, or presents a radiated appearance; and the cortex or crust, this being *usually* smooth externally, but occasionally wrinkled, rough, or even tuberculated and warty. As a rule the layers become lighter in color from the centre to the circumference, but not always. Sometimes a fractured calculus presents a crystalline aspect. The chemical composition is very variable, but the most common ingredients are cholesterin and bile pigments, with a little lime or magnesia. To these may be added biliary and fatty acids, generally combined with lime, modified bile-pigments, phosphates, carbonates, salt of soda or potash in small proportions, and metals (iron, copper, and manganese): The nucleus is often made up of mucus and epithelium, and the former material may also unite the different parts. The appearances differ according to the composition, which is not necessarily uniform even in the same layer. It is quite impossible to describe the characters corresponding to the various ingredients, but it may be stated generally that in proportion to the amount of cholesterin which a calculus contains it is whiter, more transparent, crystalline, or radiated and lamellar, and of higher specific gravity.

Biliary sand or gravel is not uncommonly met with, consisting either of cholesterin, bile pigment, or black pigmentary matter.

The morbid conditions which are liable to be set up by gallstones may be stated as follows: 1. Irritation, inflammation, suppuration, or ulceration, with consequent pyæmia or perforation, affecting either the gall-bladder or ducts, perforation taking place in different directions, but especially into the stomach, duodenum, or peritoneum, or externally through the abdominal wall: rarely into the colon, portal vein, pleura, pelvis of the right kidney, or vagina. Permanent fistulæ may be left. 2. Inflammation and abscesses in the liver, if lodged there, or the formation of a cyst around the calculi. 3. Obstruction of some of the ducts in the liver, or of the hepatic, cystic, or common bile-duct, with the usual consequences. 4. Obstruction of the intestines by a large calculus, this having probably entered through a fistulous communication from the gall-bladder. 5. Inflammation, ulceration, or gangrene of the bowel, with consequent perforation.

Symptoms.—It is only needful here to describe those symptoms which indicate the passage of a gallstone along the duct to the intestine—biliary or hepatic colic—these being usually severe, but not always. An attack of hepatic colic begins with a sudden intense pain in the right hypochondrium, in some cases most excruciating, often coming on just after a meal or after effort; it is described as constricting, griping, tearing, burning, or boring, and shoots over the abdomen, round the side of the back, or towards the right shoulder. The patient is doubled up and rolls about just like in ordinary colic, groaning or screaming, and pressing upon the abdomen, which gives some relief, there being generally no tenderness at first. The pain may subside, leaving a dull aching, but urgent paroxysms recur at intervals. The attacks are accompanied with much exhaustion, signs of collapse, a distressed and anxious expression of countenance, faintness, which may end in actual syncope, and cramps of the abdominal muscles. There is no pyrexia. Sympathetic vomiting is frequently present, and sometimes hiccough is a distressing symptom. Among occasional symptoms are observed spasmodic tremors or actual convulsions, and marked rigors. In the course of a day or two, should the gallstone reach the common duct, as a rule the usual signs of obstructive jaundice are developed, which may become intense, the duration of the jaundice depending upon that of the obstruction. When the calculus reaches the duodenum the suffering generally subsides suddenly, with a feeling of intense relief, and then the jaundice gradually disappears. In the great majority of cases biliary calculi pass on by the bowels, and are discharged in the fæces, sometimes in great numbers, without producing any further mischief, and they may be detected by washing the stools through a sieve or through muslin. Very rarely they pass into the stomach and are vomited.

There are a few points of practical import which require notice. The intensity of the pain is by no means necessary in proportion to the size of a gallstone, but rather depends upon its angular shape. It usually diminishes when the concretion reaches the common duct, because this is larger than the cystic duct, but it increases again as the orifice into the duodenum is approached. Jaundice is not a necessary accompaniment, or it may be but slight, because when the calculus is angular in form it leaves room for the bile to flow by, or its passage is sometimes too rapid to allow of the appearance of jaundice; on the other hand, this may become persistent and extreme, owing to the permanent impaction of a gallstone. It is very important to look for the calculi in the stools, as by their shape, number, and size, an opinion can be arrived at as to whether any remain behind in the gall-bladder, while at the same time their characters are recognized. After one large gallstone has escaped, other smaller ones often follow without causing any particular disturbance. Sometimes the pain subsides, but no calculus is passed, because it returns to the gall-bladder. Pain and soreness may remain after the escape of a concretion into the duodenum, owing to nervous irritability on the part of the patient, or to local irritation of the nerves ; or inflammation may be excited, indicated by pain and tenderness, with fever. The symptoms of hepatic colic are occasionally merely due to the passage of grit or inspissated bile. An attack may end fatally, from the mere intensity of the pain and collapse, quite irrespective of the serious morbid changes which a gallstone is liable to set up, any one of which may cause death.—FREDERICK T. ROBERTS.

GANGLION.—Two kinds, simple and compound. Simple is said to arise from a cystic enlargement of a cell in one of the fringes of synovial membrane lining the sheath of the tendon (Paget), and is also said to be originally a partial "hernia" of the sheath of the tendon (Billroth). Any way it is rarely found communicating with a tendon sheath at all. It is a fibrous sac, containing a fluid, usually jelly-like, sometimes quite serous in consistence.

Situation.—Most frequently over extensor tendons at back of radial side of wrist. Appearance, globular, hard or fluctuating, transparent swelling. It causes feeling of weakness and often pain.

Treatment.—1, Rupture. Place patient's wrist on your knee, then steady it with your fingers, while you squeeze, with ends of both your thumbs, the ganglion against a ridge of bone, beneath it. 2, Iodine paint or blistering. 3, Pressure. 4, Subcutaneous puncture. Follow up both 1st and 4th method of treatment with pressure by pad and bandage.

COMPOUND PALMAR GANGLION is a dilatation of a considerable part of a tendon sheath, or of several tendon sheaths. *Situation.*—Palm of hand and lower part of forearm just above annular ligament. Similar compound ganglia occasionally found in foot. *Signs.*—Fluctuating swelling above and below anterior annular ligament; crackling from melon-seed bodies usually contained within. *Treatment.*—1, Puncture with a trocar large enough to let melon-seed bodies pass through its canula. Wash away these bodies by injection with warm water. Inject tinct. iodini ʒ js+aquæ ℥ js. Let injection escape after two minutes. Then apply compress, splint and bandage. 2, Incisions above and below annular ligament. These should be longitudinal. Antiseptic dressing very advisable. Gently remove melon-seed bodies by syringing with weak carbolic lotion.—C. B. KEETLEY.

GANGRENE.—The term signifies the death of a part of the soft tissues of the body. The dead part is called a "slough," and the term "sloughing" is often applied indifferently to the diseased action which results in the slough and to the reparative process by which the slough is afterwards cast off.

Varieties.—Two main classifications: 1, into dry and moist; 2, into traumatic and idiopathic.

Causes.—A, of traumatic gangrene.—1, mechanical violence, *e. g.*, crushing and disintegrating action of a cart-wheel passing over a limb; 2. mechanical pressure, *e. g.*, bed-sore, and strangulation of a limb by a tourniquet; 3, chemical, *e. g.*, the effects of corrosive acids, or excessive heat or cold, or of extravasated urine. B, Idiopathic gangrene has for its remote causes the following: 1, General anæmia, *e. g.*, gangrene has been known to follow excessive venesection; 2. Arterial obstruction from embolism or thrombosis in cases of atheroma. This form usually occurs in old people, and is called senile gangrene. 3, Specific fevers and their sequelæ, especially typhus typhoid, and septicæmia. 4. Certain diseases, mostly inflammatory, *e. g.*, carbuncle, phagedæna, &c. 5, Poisons, *e. g.*, ergot of rye, serpent's poison, &c. Certainly many of the above causes, and probably all, act either by diminishing the supply of blood to the part, or by obstructing its escape from the part, or by both ways combined. Gangrene produced purely by diminished blood-supply is dry; that caused partly or wholly by obstructed return of blood is moist. Inflammation is an aggravating element in most cases of gangrene and an essential element in many. Two or more of the above causes are frequently combined; *e. g.*, senile gangrene results often from a wound of the toe of an old person, with atheromatous arteries.

Pathology may be inferred to a great extent from what has been said above concerning the causes, and what will be said below about the symptoms. The appearances are primarily those of a region where the vessels are either almost empty or else distended with stagnant blood. Then, in the part itself if blood can pass through it at all, but always in its immediate neighborhood, inflammation occurs. Now, if the part is exposed to the air, it next begins to decompose, and one should notice that most of the so-called appearances of gangrene, *e. g.*, foul odor, are really signs of putrefaction in the grangrenous tissues. For a time, the inflammatory and gangrenous process spreads. When it reaches its limits, the inflammation on its borders produces granulations between the living and dead regions, which granulations, as it were, push off the dead structures. In gangrene of embolic origin, emboli are found in the arteries. The line where the gangrenous process stops and the wall of granulations is formed is called the line of demarcation.

Symptoms and Course.—(1) Dry gangrene. First appearance often a brown spot on one toe; this spreads, the parts affected gradually shrivelling up, the skin wrinkling and becoming brownish black. This process is called "mummification." (2) Moist gangrene begins with signs of inflammation. Then the swelling becomes boggy, skin mottled or violet. Bullæ. Discoloration spreads and deepens. Local insensibility. Fall of temperature locally. Emphysematous crackling. Foul odor. Extent of process varies from part of toe to a whole limb. Either of above series of symptoms observed in senile gangrene. Traumatic gangrene is always more or less moist and inflammatory. If patient survives, the dead parts are cast off in the way described above (*Pathology*), the tendons and fasciæ giving way last but one, and the bone absolutely last. Process of spontaneous separation of any segment of a limb occupies months.

Constitutional Symptoms.—In traumatic gangrene, those of great prostration and fever of a low type. In senile gangrene, they may be very slight, but usually they are those of chronic septicæmia, viz., gradual exhaustion, feeble pulse, dry tongue, nervous sensibility dulled, &c.

Diagnosis.—Gangrene must be distinguished from ecchymosis caused by blows, and from lividity the result of exposure to cold.

Prognosis.—Bad, unless part affected is small or a line of demarcation has formed. Worse when from constitutional than when from purely local causes.

Treatment.—When only a small part, *e. g.*, the end of a finger, is affected, and when the cause is traumatic, treatment is purely local, otherwise it is also constitutional. Local treatment.—Two objects: 1, to promote detachment of the gangrenous parts; 2, to prevent the gangrenous parts from decomposing, and thus infecting the patient and his chamber or ward. Use absorptive compresses of tow or oakum, wet with chlorine water, carbolic lotion, &c., but not too wet. Charcoal powder. Iodoform. Never drag off sloughs. Remove them gently when they are fully formed. After separation of dead parts, treat like an ordinary granulating wound.

Question of Amputation.—It is a very safe rule in civil practice never to amputate till a line of demarcation has formed. Leave single toes to fall off. "If the whole foot or leg be affected, do the amputation so that it may be merely an aid to the normal process of detachment; *i. e.*, on the borders of the healthy parts you try to dissect up only enough skin to cover the stump, and saw the bone as near as practicable to the line of demarcation" (Billroth).

Constitutional Treatment.—Relieve pain with opium (up to gr. 1-2 every three hours) or morphia, subcutaneously. If these disagree, use chloral (gr. xx. 6tis horis) or some other anodyne. Watch their effect well. Extent to which you give or withhold stimulants and nourishment depends on relative importance you attach to remediable weakness and inflammation respectively, as factors in extending the gangrene. Nourishing food, quinine, acids, gentian, camphor, or ammonia, are used as a rule; but Syme declared that in senile gangrene he got the best results from comparatively low diet.

Prophylaxis.—For gangrene threatening from excess of tension, use free incisions. Gangrene from arterial obstruction, local warmth. Gangrene from venous obstruction, elevation of limb, support by gentle, even bandaging.—See also Bed-Sores. In severe crushes, where gangrene seems inevitable, it is better to amputate before reactionary fever has set in, unless indeed the limits of the parts hopelessly injured cannot be sufficiently made out.—C. B. KEETLEY.

GANGRENE, Symmetrical of the Extremities.—*Definition.*—Symmetrical gangrene developed independently of any lesion of the circulatory apparatus.

Causes.—Cold, moral emotions, and troubles of menstruation act sometimes as causes.

Symptoms.—Sometimes paleness of the skin, with a sensation of tumefaction at the points to be attacked, at other times the skin is covered with bluish spots and becomes dry, tense, parchment like. The process of mortification is announced by extremely sharp pains which are compared to the sensations caused by burns. WM. A. HAMMOND.

GASTRALGIA—*See Gastrodynia.*

GASTRITIS.—*Natural History.*—Idiopathic gastritis is rare; but forms of inflammation, tending to exudations and destruction of parts, or condensations of tissue, especially about the pyloric orifice of the stomach, are generally the consequence of direct injury from irritant or corrosive poisons, and especially the use of raw spirits. The simplest and most frequent form of inflammation of the stomach is characterized by active congestion and an excessive secretion of mucus—a condition known under the name of gastric catarrh, similar in character to that of the air-passages. It may be either acute or chronic. In the acute form the mucous surface is reddened in spots by a fine injection, its tissue relaxed, and its surface covered by a layer of tough mucus. There are also certain morbid states of the stomach, resulting out of forms of inflammation, expressed by—(*a*) Softening of tissue; (*b*) grandular degeneration of the proper mucous substance; (*c*) congestion. The symptoms of abnormal states of the stomach express themselves by—(1) Vomiting, associated often with lesions of other organs; (2) deficient secretion of gastric juice; (3) fermentative processes (alcoholic, butyric, or lactic), tending to the development of entophytes, such as sarcinal; (4) indigestion, associated with and depending upon—(*a.*) Morbid states of those viscera which are conjoined with the stomach in the processes of digestion, such as the liver, pancreas, and small intestines; (*b.*) imperfect action of the kidneys, as in Bright's disease; (*c.*) defective or diminished morphological changes during the processes of nutrition in the tissues, generally expressed by altered secretions and excretions, as in many constitutional diseases; (*d.*) indigestion, associated with pyrosis and increased secretion of the juices of the stomach and salivary glands, and with cutaneous disorders, such as urticaria; (*e.*) indigestion, associated with drunken habits. The diseases of the stomach with which one or more of these organic or functional states may be associated are,—Gastric catarrh and gastritis, chronic ulcer, hæmatemesis, perforation, dilatation, structure, gastric fistula, hernia, cancer, colloid tumors (non-malignant), sarcinæ, injuries, laceration, dyspepsia, gastrodynia, pyrosis. The symptoms of gastric catarrh usually take the form of what is commonly called a "disordered stomach," expressed by headache, especially across the forehead, increased on stooping, and then associated with flashes before the eyes, and a sensation of tightness, as if the head would burst. Nausea and sickness exists, with sensations of heat and of cold, distaste for food, the sight or smell of which is apt to produce sickness, retching, and vomiting. The food already in the stomach undergoes an abnormal decomposition; lactic and butyric and acetic acids are produced, and fetid gases are set free by these fermentative processes. Eructations into the mouth of sour and rancid matters are also common. The tongue is generally coated with a white creamy fur; the odor of the breath is offensive, the mouth feels clammy, and the taste is bad. Gastritis from poisoning causes general depression, so great in some cases as to simulate perforation. The pain generally spreads from the epigastrium over the abdomen, and is accompanied with vomiting of mucus or of bloody mucus, which may be followed by purging of similar evacuations, preceded by severe colicky pains, and followed by collapse, small pulse, cold skin, and clammy sweat.

Treatment.—Emetics are required in cases where the stomach has been overloaded; and it is certain, from the gases and fluids causing prominence over the stomach, that it contains decomposing food. One scruple of ipecacuanha, with one grain of tartrate of antimony, is the safest and most efficient emetic. When injurious matters have passed into the bowels, causing flatulence and colicky pains, mild laxatives may be required, such as rhubarb, or compound infusion or mixture of senna, or fluid magnesia, in small doses, may be given every hour or two hours, followed by five to ten grain doses of bicarbonate of soda. In cases of acute gastritis, mercurial purgatives by calomel are of great service. Three to five grains may be given to an adult, followed by a dose of castor oil or the compound senna mixture of the pharmacopœia. Where it is not desirable to act so searchingly on the small intestines, blue pill, with compound colocynth or rhubarb pill used in equal parts (aa gr. ii.), combined with one grain of ipecacuanha powder, is a mild and gentle laxative. Iced water to drink in small quantities, or small pieces of ice in the mouth, tends to allay thirst, and to relieve pain; and the continuous use of hot-water tomentations over the region of the stomach, as hot as the patient can bear them, are of great benefit.—William Aitken.

GASTRODYNIA.—*Etiology.*—This term indicates a painful neuralgic affection of the stomach, chiefly met with among females, especially about the time of puberty, or when the menstrual functions are declining. The conditions with which the complaint is mainly associated are physical exhaustion and debility, anæmia, hysteria, hypochondriasis, nervous exhaustion from depressing emotions, anxiety or excessive mental effort, gout or rheumatism, and uterine or ovarian derangements, including pregnancy. Sedentary habits, with habitual constipation, and excessive use of hot tea, have appeared to me to have had considerable influence in originating this affection in some cases. Occasionally it results from the action of malaria, and in rare instances depends on central nervous disease.

Symptoms.—The prominent symptom of gastralgia is epigastric pain, varying much in its severity and characters, usually paroxysmal, and coming on either at regular or irregular intervals, though in many cases there is never complete relief. During the paroxysms the suffering may be extreme, especially in cases of hysteria or gout. Food frequently gives decided relief, the pain returning as the stomach becomes empty. Sometimes indigestible substances afford more ease than those which are digestible and soothing. Some patients, however, suffer intensely when they take anything, or after particular articles, such as hot tea. Pressure generally relieves, especially when made firmly and continuously, but there may be some superficial tenderness. Various curious sensations are often complained of in the epigastrium. During the severe attacks of pain, spasmodic movements of the stomach and bowels may be observed, with cramps of the abdominal muscles. Dyspeptic symptoms are habitually present in most cases, such as acid and gaseous eructations, flatulency, heartburn, or pyrosis. The tongue may be fairly natural. In hysterical cases chronic vomiting is sometimes a very distressing symptom, and not uncommonly a morbid craving exists for improper and indigestible articles of food. The bowels are generally very constipated. Frequently other nervous disturbances are observed. In some instances there is considerable emaciation, especially if food is not taken, but it is remarkable what a slight degree of wasting may attend the chronic vomiting of hysteria. Aortic pulsation is often present.—Frederick T. Roberts.

GASTROTOMY.—A term applied to two distinct operations, viz.: 1, opening the stomach; 2, opening the abdominal cavity only.

Gastrotomy, or operation of making opening into stomach. Called "Gastrostomy" when done for disease of the œsophagus. *Indications.*—1. When a foreign body has entered the stomach, and cannot safely either pass through the pylorus or be vomited or extracted by the mouth. 2. When an impervious stricture of the œsophagus is of traumatic origin. Indication is then imperative. 3. In cases of cancer of œsophagus. In these, though death has always speedily followed operation, yet patient's sufferings have been much relieved. *Prognosis.*—Usually followed by speedy death when done for disease of the œsophagus,* but very safe (1 death in 11) when done for foreign body. In former case, death is more from advanced disease than from operation. *Operation.*—Scalpel, forceps, ligatures, director, hooks, catch-forceps, retractors, handled needles, silk ligatures, bits of bougie for quilled suture. Incision, curved for 4 inches, just internal to edge of left costal cartilages, from sternal extremity of seventh intercostal space, downwards and outwards. Divide

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Two successful cases: Verneuil's, see *Lancet*, Jan. 13, 1877; and Staton's, see *Med. Press and Circ.*, Dec. 29, 1880. Both were dressed antiseptically.

successive layers on a director. Edge of left lobe of liver may be useful as guide to stomach. Pull stomach out with finger and thumb. When quite certain of having got the right viscus, seize it with catch-forceps, if gastrostomy is to be done. Two double ligatures from side to side through lips of wound and wall of stomach. Open viscus. Pull ligature loops out of wound and divide them. Quills inside and out. Additional sutures at corners of wound. Unless patient is much exhausted, feed by enemata only for first twenty-four hours at least. When operating to remove foreign body, make opening in stomach small, and sew up with continuous suture unless opening spontaneously closes.—C. B. KEETLEY.

GENU VALGUM—*See Knock Knee.*

GESTATION, Extra-Uterine—*See Fœtation, Extra-uterine.*

GIRAFFE—*See Dengue.*

GLANDS, Scrofulous Diseases of—*See Scrofulous Disease of Glands.*

GLANDERS.—*Definition.*—An acute infectious disease of the horse, ass, mule, communicable to man by inoculation of a wound or abraded surface, and it is said by the prolonged contact of infected matter with the unbroken skin or mucous membranes, or by inhalation of air impregnated with the poisonous particles. It produces severe constitutional symptoms, and usually a pustular rash.

Symptoms.—The disease as it occurs in animals need not be discussed, except to remark that there is no essential difference between glanders and farcy. They are both caused by the same virus, both equally contagious, and differ only in certain clinical and anatomical details. The "farcy buds" are merely one of the manifestations of "glanders," as a gumma or tubercular syphilide is of syphilis. According to the course and duration of the disease, an acute, subacute, and chronic form of glanders may be described. In acute glanders, after an incubation period of three to five days, or even of two or three weeks, *malaise*, loss of appetite, and obscure pains in the joints and muscles of the extremities are experienced. At the same time the skin round the wound or excoriation which has been inoculated becomes red, painful, and slimy; the lymphatics and glands become enlarged, red and painful, and there is often an erysipelatous redness or cellulitis extending for a considerable distance round. The ulcer enlarges, its base and sides become corroded and grayish-white, with a foul discharge; there is great prostration, with severe pain in the joints and muscles, and high fever is often present. Rigors are rare unless the disease is complicated with septicæmia.

If the attack be produced by inhalation of the poison, it commences with general symptoms only, and the first definite sign is the eruption. This consists of red spots,—at first small papules, but soon enlarging into little indurated tubercles about the size of a pea,—scattered over the face and more or less over the rest of the body. Pustules, and occasionally vesicles, soon form on their apices, burst, and leave foul ulcers. Sometimes larger nodules—farcy buds—at first form along the course of the lymphatics of the skin and subcutaneous tissue, but soon break down and suppurate, leaving deep irregular ulcers with sloughing surfaces. Similar nodules and abscesses in the intermuscular tissue, and suppuration in and around the joints, are often met with, also hæmorrhages into the swellings. In the affection of the mucous membranes, especially of the nose, either at the beginning, if the disease has been inoculated there, or after the previous phenomena, there is severe pain and swelling with a mucous discharge, clear and viscid at first, but later brownish, offensive, and sauguineous. Tumors and ulcers may be found in the nose. Severe cough, pain in the chest, and expectoration of matter resembling the nasal discharge mark the implication of the lungs with the disease growths. The pulse is small and frequent, headache is often severe, and delirium is not uncommon.

In subacute glanders the symptoms are, on the whole, the same, only less intense and more protracted. The pain and the retarded suppuration caused by the ulcers usually produce a condition of hectic.

In chronic glanders there is, as in the acute forms, at first redness and swelling round the innoculated spot, with inflammation of the lymphatics, glandular enlargement, and some fever. The general symptoms subside for a time, but the ulcers go on slowly spreading in some places, healing in others. After a time nodular tumors or farcy buds, red spots, and pustules may arise, producing abscesses and ulcers on the skin, in the muscles, joints, and viscera. The nasal and other mucous membranes become affected, as in the acute form, and tubercles or ulcers about the larynx give rise to hoarseness or sudden œdema of the glottis. Bronchitis and pneumonia are frequently met with.

The fever may be high if there is much suppuration and rapid formation of abscesses, or may assume a hectic type.

Even in the event of a favorable course recovery is very slow, and often incomplete; the abscesses and ulcers gradually heal, the nasal discharge lessens and finally cases, and the gastric and respiratory symptoms disappear. It is necessary to add that at any time the chronic variety may become acute and rapidly fatal.

Diagnosis.—The inoculation wound may be at first mistaken for the result of cadaveric poisoning, but is distinguished when the rash, nasal affection, and other symptoms set in. When acquired by inhalation, or where no wound is present, the early symptoms may lead to confusion with enteric fever if there is much pyrexia, *malaise*, headache, and delirium, or with rheumatic fever if the joint and muscular pains predominate. The appearance of the rash and nasal complication soon makes the diagnosis clear.

The papules may at first resemble those of variola, but they are larger and not "shotty;" they soon develop into pustules and ulcers, instead of drying up into scabs; and abscesses, usually absent in variola, are almost constant in glanders.

Chronic glanders may be mistaken for syphilis; the history of contact with horses or persons suffering from the former, and the absence of the usual signs of the latter, will suffice to distinguish between the two diseases.

Prognosis.—Acute glanders is nearly always fatal, usually in seven or ten days from the onset of the attack. In the subacute forms of the disease death does not occur till after the second or third week, and about twenty-five per cent. recover.

In the chronic form the usual duration is about four months, and fifty per cent. recover.

Treatment.—No treatment is of any avail in the acute forms of the disease. In the chronic little can be done beyond keeping up the strength with a liberal and stimulating diet.—MALCOLM MORRIS.

GLANDULAR TUMOR—*See Adenoma.*

GLAUCOMA is so called from the occasional greenish appearance of the pupillary area. The pathognomonic symptom in all cases of glaucoma is increased hardness or "tension" of the eyeball.

Classification.—1, acute; 2, chronic; 3, secondary.

ACUTE GLAUCOMA.—*Early Symptoms.*—Increased tension. Rapidly increasing presbyopia. Periodic dimness of sight. Halos or "rainbows" around the candle or other lights. Diminution of the field of vision.

Later Symptoms.—Acute pain. Congestion of conjunctiva, and of ciliary region. Dilated and sluggish pupil. Rapid impairment of vision. Tension of globe much above normal. T+1 to T+3 or T+4. There may be turbidity of the vitreous obscuring the fundus, otherwise the Opthalmoscope reveals—1, Cupping of the whole of optic discs, the edges being abrupt. 2, Probably pulsation of the retinal vessels. 3, Tortuosity of the veins. 4. Small hæmorrhages occasionally.

CHRONIC GLAUCOMA presents the same symptoms as the acute form, but in a modified degree. The tension of the globe is above normal, T+½ to T+1 or T+2, but the increase of tension is less rapid. The pain is much less, and may be absent altogether.

SECONDARY GLAUCOMA is so called when occurring as a result or complication of some other disease or injury of the eye, as iridochoroiditis, needle operation, &c. It is a very grave symptom.

Pathology.—What is the cause of the increased tension? Theory 1. Active contraction of the sclerotic. 2. Excess of fluids of eye from increased supply of blood. Defective removal of fluids from eye.

The region of the ciliary body is generally found to have undergone great changes. It becomes shrunken to half its natural size, its muscular fibres are atrophied and sclerosed. The base of the iris is found to be closely applied to the marginal part of the cornea. The ciliary arteries are enlarged. These changes are supposed to impede the escape of fluid from the anterior chamber, and perhaps from the vitreous also. The glaucoma cup is caused by pressure from within. The lamina cribrosa which forms the floor of the optic disc being the weakest part of the capsule of the eye, slowly yields, becomes depressed and hollowed out, causing atrophy.

Treatment for Acute Glaucoma.—Perform iridectomy without delay. (1) Make incision partly in cornea and partly in sclerotic. (1) Make wound large enough to allow of exit of one-fifth of iris. (3) Remove iris quite up to its ciliary attachment.

Apply leeches to eye, and warmth; give purgatives and derivatives internally.

In Chronic Glaucoma.—First try action of eserine drops, with local depletion, and calomel and opium internally. If tension continues to increase, perform iridectomy as in acute cases.

Sclerotomy, by similar incision to that of the scleral iridectomy, but without removing a portion of iris, is sometimes practised. Trephining the sclerotic behind the ciliary region has also been introduced, but these are both less efficient than iridectomy.—H. JULER.

GLEET—*See Gonorrhœa.*

GLIOMA—*See Tumors, Sarcomatous.*

GLOSSITIS—*See Tongue, Diseases of.*

GLOTTIS, Œdema of—*See Larynx, Diseases of.*

GLOTTIS, Spasm of—*See Laryngismus Stridulus.*

GLYCOSURIA—*See Diabetes Mellitus.*

GOITRE—*See Bronchocele.*

GONORRHŒA.—*Definition.*—Inflammation of mucous membrane of male urethra or of female genitals, following impure sexual intercourse. I have worded the definition as above because, in practice, one applies the term gonorrhœa to any urethritis following impure intercourse, whether there be specific contagion or not.

Causes.—1. Specific infection by contact with gonorrhœal or gleety secretion 2. Irritation or infection by non-specific secretion from a diseased mucous surface (?).

Symptoms and Course.—Four stages. 1. Premonitory.—Itching, swelling and stickiness of meatus; occurs about two to seven days after intercourse and lasts twenty-four hours, more or less. 2. Inflammatory.—Scalding, discharge of pus, painful erections, chordee, tenderness along urethra; or confined to part actually inflamed. Occasionally spasmodic retention. Glans and prepuce swollen; sometimes phimosis or paraphimosis. Duration, one week to one month. 3. Inflammation passes gradually away, but a thick discharge remains. 4. When only a thin serous discharge remains, called gleet.

Pathology.—Redness, swelling, &c., of mucous membrane of urethra. Occasionally slight excoriation or ulceration. Micrococci and vibriones have been found in gonorrhœal pus, and perhaps infest the inflamed membrane itself. Parts chiefly affected, fossa navicularis and bulbous part. Cause of chordee, effusion of lymph into corpus spongiosum, which effusion prevents lower border of penis from extending proportionally during erection.

Complications.—Bubo, balanitis, phimosis, paraphimosis, hæmorrhage, cutaneous rash, gonorrhœal rheumatism, epididymitis, cystitis, prostratitis, retention of urine, chordee. All but chordee are noticed in separate articles.

Treatment.—Local and general. Local is effected by (1) injections; (2) soluble bougies of cacao butter (Sir H. Thompson and Mr. W. T. Cooper*) or of "ice" (Abrath); (3) insoluble bougies, *e. g.*, wax, ivory, &c.; (4) clay bougies (Chiene); (5) powders insufflated (Wilders, Lancet, vol. i. p. 73). There are also external local applications, such as cold sitz bath, ice to perineum, blisters (Milton), &c.

Rules for Injecting.—Pass the nozzle into the urethra, right up to the hilt, and press it home. Hold the glans close up to it with the left finger and thumb. Inject slowly about half a drachm. (There need be little or no fear of mischief from an ordinary injection entering the bladder. It is unlikely to get so far at all.) Retain the injection three to five minutes if possible. In most cases inject after each urination.

Injections.—As a basis, "strong" tragacanth mucilage is excellent. It will remain in the urethra all night. The many urethral injections which have been used successfully may be classed, more or less accurately, as (1) antiseptics, (2) astringents, (3) sedatives, (4) cleansing. Antiseptics: iodoform (gr. xxx to tragacanth. emuls. ℥ j), carbolic lotion (1 to 40), permanganate of potash (gr. j- ℥ j), chloralum (gr. iii to ℥ j), borax (gr. v- ℥ j), zinci chlor. (gr. j- ℥ j). With these might be classed also solutions of iodine, chlorate of potash and many also of the astringent injections, which are both astringent and antiseptic. Glycerine is constantly combined with injections of all kinds, and its value possibly lies in its power of checking fermentative changes. Secondly, astringent injections: tannic acid (gr. v- ℥ j), zinc sulph (gr. ij- ℥ j), zinci sulpho-carbolat. (gr. ij- ℥ j), zinci acet. (gr. ij- ℥ j), plumbi acet. (gr. ij- ℥ j) argent. nit. (gr. ¼- ℥ j). Also solutions of kino, catechu, and eucalyptus gum. Thirdly, sedative injections: sedatives are almost always used in combination, *e. g.*, liq. morph. acet. m. x, glycerini acidi tannici m xx, aquæ ℥ j. Fourthly, cleansing injections, such as warm water, used in very acute gonorrhœas. Many excellent injections are combinations. Such a one is the French injection of M. Brou, containing probably calamine, opium, and some vegetable decoction. Powders, such as zinci oxid., in suspension, are believed to cling to the urethral surface.

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*As cacao butter bougies melt as soon as they enter the urethra, they differ little from a thick fluid injection. They have these advantages, that they are sure to enter the urethra, and that they remain there, but they do not distend the urethra, as a properly administered fluid injection does, for several minutes. A soft and flexible bougie which will slightly distend the urethra as long as may be desired, can be made as follows: Roll a square piece of antiseptic gauze, like a pipe-light, dip it into medicated cacao butter, or into medicated vaseline thickened by mixing with sperm or firm paraffin. Use for gleet only.

Soluble Bougies can be medicated with any of the above substances. It is customary to place a piece of lint or cotton-wool over the meatus after passing the bougie, and to fix it with strapping.

Insoluble Bougies are sometimes dipped in an active agent, sometimes used unmedicated, for gleet.

Modifications in Treatment according to the Stage of the Disease.—First stage. "Abortive treatment." Best as much as possible; at all events avoid fatigue. Moderate diet. No stimulants. Frequent cold hip-baths; saline purgatives; alkaline and demulcent drinks; acetate of potash; weak astringent and antiseptic injections repeated as often as possible (acid. tannic. gr. v, glycerini, m xx, aquæ ℥ j). Second stage. General treatment same as first stage. But be more cautious about introducing irritants into the urethra. Treat complications. For chordee: belladonna extract along outside of corpus spongiosum, morphia and henbane suppositories; warm baths; sleeping draught at night. Sp. camph. ʒ ss doses, internally. One minim of tinct. aconiti every hour will sometimes cut short this stage. Third stage. Still prohibit stimulants and avoid fatigue. Persevere with injections; vary them if the case be obstinate. For use of copaiba, &c., see below. Fourth stage (that of gleet). Continue injections and general treatment, but improve diet. Change of air. Tonics, *e.g.*, iron, quinine, strychnia, gentian, &c. But gleet is so often kept up by a slight stricture, that it is imperative to examine well the urethra in obstinate cases, and to dilate it if necessary. It is a good rule, in treating gonorrhœa, to inject after every act of micturition. Persons away from home all day should use the compressible metal tubes, filled with injection, and having a nozzle to enter the urethra, made at my request, by Mr. Cooper, of 26 Oxford Street. They should be carried in the coat side-pocket. Mr. Watson-Cheyne urges that, in treating a gonorrhœa, the first thing to aim at should be the destruction of the specific nature of the disease. To effect this he recommends a bougie (iodoform, gr. v., ol. eucalypti, gr. v. ol. theobromæ. q. s). Patient passes the bougie, and lies down for six hours. Follow up with injections of emulsion of eucalyptus oil till a slight simple urethritis remains. Then resort to some ordinary astringent injection. The chief difficulties in curing a gonorrhœa arise from the disobedience or impatience of the patient, who relaxes his attention to his disorder as soon as it begins to improve, whereas he ought to persevere with the treatment even for a week after the disease is apparently quite cured. Within that period, even half a glass of claret may cause a relapse. The following rule is of prime importance. The surgeon should teach the patient how to inject. He should administer the first injection himself; and, if it be effectively done, this first injection may strike the death-blow of the gonorrhœa. A suspensory bandage should be worn as a prophylactic against epididymitis. The ordinary one is often quite useless. The bandage made by Messrs. Arnold, of West Smithfield, should be used. To absorb the discharge, and keep the linen clean, an excellent application is a thin layer of absorbent cotton-wool, stuck to gutta-percha tissue, and tied to the penis by a piece of tape. Chastity is necessary in the first three stages. Gleet is not always infectious, but abstinence from intercourse is desirable even during this stage.

Copaiba, Cubebs and Oil of Sandal Wood.—Copaiba not advisable in the acute stage, cubebs best in first stage, oil of sandal wood good for any stage. Dose of copaiba, 2 capsules three or four times a day, or 3 gr. of the balsam made into an emulsion with yelk of egg, or floating on infusion of roses, three times a day. Dose of cubebs: a heaped teaspoonful four times a day *mixed with soda-water.* *Cubebs and copaiba together:* make the cubebs up into pills with copaiba balsam and white wax, and give ten pills three times a day. Dose of oil of sandal wood: m. xv ter die. ℞ ol. santalini ℥ ss. sp. vini rect. ℥ iss. m ft. mist. S. ʒ j ex aquæ ℥ j ter die.

Copaiba Rash is papular, and sometimes resembles urticaria, sometimes measles; but there is no fever, and the rash is patchy, chiefly affecting skin over joints. Warn patients of danger of gonorrhœal ophthalmia.

Gonorrhœa in Female.—*Parts affected.*—Vagina and vulva. Disease may spread considerably, even up urethra to bladder, and, it is said, through Fallopian tubes to peritoneum. Other complications are bubo, labial abscess, and warty growths. Less common are metritis and ovaritis. *Treatment.*—Main special points are, to use large quantities of weak injections pumped freely into vagina, to insert a piece of clean lint between the labia after each injection, and to prescribe rest, both local and general.—C. B. Keetley.

GONORRHŒAL OPHTHALMIA (Purulent Ophthalmia)—*See Conjunctiva, Diseases of.*

GONORRHŒAL RHEUMATISM.—An affection analogous to acute rheumatism, but associated with or consequent on gonorrhœa.

It attacks patients who never suffer from rheumatism, except when they contract gonorrhœa, and sometimes it recurs in the same patient with every gonorrhœa he contracts. It commences either when the discharge continues profuse, or when it has been more or less speedily suppressed, or after it has quite disappeared. The parts affected are generally the knee-joints, or the knee, ankle and toe of one side. Rheumatic ophthalmia, as sclerotitis, is not unfrequent at the same time. When it extends to more joints than one, the first affected joint does not recover its normal condition, but continues after other joints have been implicated. It is rare for the heart to suffer. The sheaths of the great sciatic nerve sometimes suffer, when the pain along the course of the nerve is very obstinate (gonorrhœal sciatica). Women rarely suffer.

Treatment.—Rest, with anodyne fomentations of the affected joints, and opium internally.—William Aitken.

GOUT, Acute—*See Acute Gout.*

GOUT, Chronic
GOUT, Rheumatic —*See Chronic Gout.*
GOUTY SYNOVITIS

GREASE—*See Equinia Mitis.*

GREEN SICKNESS—*See Chlorosis.*

GROCERS' ITCH is similar to Bakers' itch, except that it is caused by the irritant action of sugar.—Fox.

GUINEA-WORM DISEASE.—This is very common in tropical climates. Usually what happens is this: the worm (Filaria medinensis), when quite small, bores its way into the skin, generally of one of the lower extremities, quite unnoticed by the patient. It nestles in the connective tissue for several months, when it has attained a length of perhaps ten or twenty inches or more, and the size and aspect of a piece of flattened whip-cord, of moderate thickness. It now sets up more or less irritation, and at one point an abscess threatens to form, and generally a bleb forms, which bursts and leaves a livid looking surface the size of a half crown, in the centre of which an aperture appears, through which the worm emerges, sometimes wriggling about in lively fashion. The parts around are brawny and painful, and the patient is crippled for the time. If about an inch of the worm be gently pulled out each morning, and wound round a little piece of cardboard or a quill, the parasite can be completely removed in a *few days*, and the wound speedily heals afterwards. We have seen a worm twenty-three inches in length protrude one day an inch or two, and come away in a poultice applied the next night, in a patient to whom assafœtida had been liberally given for several days previously.—*Epitome of Skin Diseases, By T. Fox & T. C. Fox.*

GUMS are affected by abscess (so-called gum-boil), by ulceration, and by hypertrophy. Abscess arises from irritation of carious tooth. Foment; open when abscess has fairly formed; attend to teeth. Ulceration is caused by, mercury, scurvy, syphilis, and, indeed, any other cause of stomatitis. Remove cause. Wash with pot. chlorat.; paint with sol. argent. nit. gr. x-℥j, or touch with solid argent. nit. Tonics and pot. chlorat. internally. Hypertrophy may require outgrowth to be snipped off.

GUN-SHOT WOUNDS.—Belong to the class of contused wounds. *Causes.*—1, Mere explosions of powder; 2, wadding; 3, small shot; 4, bullets and slugs; 5, cannon-balls; 6, splinters of shells.

Pathology and symptoms are most conveniently described together under the head of.

Characters.—Four chief forms of gun-shot wound, viz:—1, Simple contusions. Caused by spent shot, or by "oblique impact." Formerly attributed to "windage." May produce most severe internal injuries with no visible damage to the skin. 2, Superficial wounds, grooving not tunnelling the flesh. 3, When bullet lodges. Particles of clothing, &c., may enter with it. 4. Where the bullet pierces and escapes. Though bullet escape, foreign bodies carried in with it may remain. Rifle-bullets, as distinguished from musket-bullets, make cleaner and less contused wounds, but smash and splinter bones, and pierce the body with a more straight and undeviating course. They also cause greater shock.

Shock.—Depends much upon individual constitution. Is usually great. *Pain* usually slight, often unnoticed.

Hæmorrhage.—Primary is rarely serious, except when the largest vessels are wounded. Secondary is very common, perhaps because of bad sanitary conditions to which an army is exposed.—*Burns* from powder may occur at close quarters.

Examination.—First see how many wounds there are. Then, at least in civil practice, examine patient's clothes. Apertures in them may indicate the direction of the wound; the absence of a piece of cloth may suggest its presence in the wound; or the exit of the bullet may, in rare cases, be proved by its being found in the clothes. Then explore the wound with the finger carbolized. But in gun-shot wounds of the chest or abdomen, the surgeon should insert neither probe nor finger, unless he is prepared to follow up his search, if necessary by operative measures. Place the patient in the attitude in which he received his wound; its direction can thus be better judged. Examine carefully once for all. Counter-manipulation with the fingers of the other hand to assist the finger in the wound.

Instruments for detection of bullets.—Nelaton's probe (porcelain head). De Wilde's electric bell indicator. Krohne and Sesemann's electric indicator. Lecompte's stilet-pince, which bites a piece off the supposed bullet.

Objects of examination.—1, To search for foreign bodies; 2, to ascertain direction and extent of wound; 3, to estimate amount of injury done to certain parts, *e.g.* fractured bones.

Apertures of exit and of entrance.—Former is cleaner and smaller than latter, smaller even than the ball which made it. Latter is everted and larger and lacerated. The quicker the passage of the ball the less are these differences; and they are sometimes *nil*. Only part of a bullet may have escaped by the aperture of exit, if a bone have been struck. Or a spent bullet may make its exit in twó places. Bullet may rebound from a bone and fall out of aperture of entrance. Course of slow bullets sometimes very peculiar.

Healing.—1, Small ring-shaped slough and gangrenous shreds thrown off. 2, Granulation and suppuration. Opening of exit usually closes before that of entrance.

Prognosis.—Depends entirely on amount and position of injury. "The extensive tearing and crushing caused by large missiles do not differ from other large crushed wounds caused by machinery."

Treatment.—Principles of treatment same as those of other contused wounds; differences of detail chiefly depend on peculiarity of surrounding circumstances.

1. In battle check hæmorrhage by pressure, apply extemporized splints to fractured limbs, give stimulants in case of syncope, and convey patient to place of first dressing.

2. Apply first dressings at place previously selected. Here also remove all foreign bodies that are near the surface and amputate limbs hopelessly crushed. Attach to each patient, before sending him on from here, a card with short account of his case, stating, *e. g.*, whether ball has been extracted or a wound of the trunk is or is not perforating.—Field officers should ligature, if possible, every wounded vessel of importance (Longmore).

3. Convey patient to hospital. Here examine every patient, operate, dress wounds, bed, and diet. Many wounded should not be kept collected in one place. *Extraction of bullet.*—Tiemann's forceps. Coxeter's extractor. If violent measures would be required for removal of bullet, let it remain, unless it is obviously setting up irritation. *Dressing.*—The main point is not to actively close the wound, but to leave free room for the discharge to escape. Tenax and oakum very good.

GUN-SHOT WOUNDS OF SPECIAL PARTS.—*Head.*—Very dangerous, from the diffused injury done to the brain and its membranes. Inner table fractured more than outer. Frequent complication with meningitis, abscess, &c. Gunshot wound of brain almost always fatal. Fracture with depression usually fatal.—*Treatment.*—Perfect rest, darkness, low diet. Cold locally. Venesection may be useful. Trephining contra- indicated. Do not mistake a wound in which part of outer table of skull has been ploughed off, for fracture with depression.

Thorax.—Classification, diagnosis, complications, etc., much the same as other wounds of chest. Non-penetrating wounds of any violence almost sure to bruise lung. Penetrating wounds fatal nine times out of ten.—*Treat* like other wounds of chest. Allay first hæmorrhage, secondly inflammation. To check bleeding from an intercostal artery:—a large piece of linen is laid over wound, "and the middle portion of this linen is pressed into the wound by the finger; so as to form a kind of pouch. This pouch is then distended by sponge or lint pushed into it until the pressure arrests the bleeding; on stretching out the corners of the cloth the pressure of the plug will be increased" (Longmore).

Abdomen.—Resemble wounds from other causes. But even non-penetrating wounds often fatal. *Penetrating* wounds. Ball may pierce more than one viscus. The chief sign, sometimes the only sign, of penetration is the extreme collapse. Recovery may take place; then often a fæcal fistula. Gun-shot wounds of bladder have often recovered. Proposal, in case of injury of viscera, to open the abdomen, search, clean, and suture.

Extremities.—Injuries to soft parts only, usually do well, unless some large artery or nerve be struck. Injuries to bones are remarkable for comminution and frequency of longitudinal fissure into joints. Consequent great liability to osteomyelitis and blood-poisoning. Impossible to be so conservative in treatment as is usual in civil practice. The rule is to amputate for fractures in middle and lower third of femur. Put up most other fractures in immovable plaster case. In gun-shot injuries of extremities, as of other parts, ordinary rules of surgery apply, only bearing in mind the smashing and splintering and the special difficulties in after-treatment. Hence, excision of knee and hip condemned by experience. Shoulder, elbow, and ankle suitable for excision. Put up excisions in immovable plaster cases. In some cases of wounded knee-joint, an attempt may be made to save the limb; here again a plaster case is necessary. Fractured thighs not to be transported far to hospital.—C. B. KEETLEY.

HÆMATEMESIS.—*Etiology.*—Blood may find its way into the stomach under a variety of circumstances. As a rule it comes from the vessels of this organ, being usually capillary in its origin, but sometimes due to the erosion of a large vessel; it may, however, be derived from other sources. The causes of hæmatemesis may be thus classified: 1. Traumatic, from external violence over the epigastrium. 2. Diseased conditions of the blood, especially in yellow fever. 3. Vicarious, particularly in connection with deficient menstruation. 4. Injury by foreign bodies or destructive chemical agents which have gained access into the stomach. 5. Abnormal conditions affecting the stomach itself. Thus hæmorrhage may be the result of violent vomiting and retching, congestion from any cause, inflammation, ulceration, cancer, or rarely atheroma of the vessels, embolism or thrombosis, or varicose veins in the stomach. 6. Diseases of other organs and structures, especially those in the vicinity of the stomach. These chiefly act by inducing extreme mechanical congestion, which may follow any great obstruction of the portal circulation, but especially that due to cirrhosis of the liver, thrombosis of the portal vein or its branches, pressure upon the portal trunk or vena cava inferior, and long-continued cardiac or pulmonary affections. Acute atrophy of the liver is often attended with hæmatemesis, which is then partly due to the state of the blood. Splenic disease may originate this symptom in both ways. Sometimes a neighboring disease *e. g.*, cancer of the pancreas, destroys the coats of the stomach, and thus opens its vessels. Occasionally an abdominal or thoracic aneurism bursts into this organ. It is stated that an omental hernia may drag it downwards, and thus lacerate the mucous membrane. 7. It must not be forgotten that blood may be swallowed, coming either from the œsophagus, mouth, throat, nose, or respiratory organs. The blood of animals also is purposely swallowed sometimes, either by hysterical girls or by malingerers, being afterwards rejected.

Symptoms.—Hæmorrhage into the stomach may not be attended with any external indications, either because the blood is poured out so abundantly as to kill instantly, or, on the other hand, because it is in very small quantity. In the majority of cases, but not always, there is either some obvious cause of the hæmorrhage, or it is preceded by symptoms referable to the stomach, or by signs of organic disease in its vicinity. Usually the blood is rejected, either by a mere act of regurgitation, or in most cases by more or less violent vomiting, though it must be remembered that this act may be the cause of the bleeding. The quantity of blood discharged necessarily varies much, and it is generally more or less mixed with food and other materials. Its characters are in the majority of cases very distinctive, it being non-aerated, brown or black in color, grumous, often resembling "coffee-grounds," soot, or tar, and acid in reaction. Should the blood be coagulated, the clots are broken up, irregular, firm and heavy. On microscopic examination the red corpuscles are seen to be much altered in shape or destroyed, and pigment-granules are abundant. Most of these characters depend upon the action of the gastric juice on the blood. If the blood is discharged immediately or soon after its escape into the stomach, it may be quite bright and unaltered, or only slightly changed. Commonly some of it passes on into the bowels, giving rise to tarry stools. The general symptoms indicating loss of blood will of course be present in proportion to the extent of the hæmorrhage.

Diagnosis.—The most important matter is to distinguish between hæmatemesis and hæmoptysis, which can usually be done by a consideration of the following points: 1. The age of the patient, hæmatemesis being more frequent later in life than hæmoptysis, except in the case of young women who are the subjects of perforating ulcer. 2. The previous and existing symptoms, as indicating some condition likely to give rise to one or other form of hæmorrhage, and also the symptoms immediately premonitory to the attack, in the one case pointing generally to the stomach, in the other to the lungs. 3. The mode of discharge of the blood, whether by coughing or vomiting. It must be remembered, however, that vomiting may be excited by the cough in hæmoptysis, or some of the blood may be swallowed and afterwards rejected from the stomach. 4. The characters of the blood, as already described, with reference to color, aeration, general aspect, reaction, and microscopic appearances. 5. In hæmoptysis some blood usually continues to be discharged in the expectoration for a certain time after the main bulk has been expelled, which is not the case in hæmatemesis. 6. Along with hæmatemesis altered blood is usually seen in the stools. 7. Careful physical examination will often reveal some organic cause likely to give rise either to pulmonary or gastric hæmorrhage, and, in connection with the former, there may be *rales* indicating the presence of blood in the bronchial tubes.

As regards the cause of hæmatemesis, this can only be made out by a thorough consideration of the case in all its details. Blood coming from above may be usually detected by local examination of the throat and nose. It is necessary to warn against mistaking the color due to altered bile or iron for that of blood.

Treatment.—The principles of treatment in hæmatemesis are the same as for other hæmorrhages. In addition to bodily rest, the stomach must be kept in a state of absolute repose in severe cases, nutriment being administered only by enemata; in less dangerous cases very small quantities of cool or iced liquids being alone permitted. The patient should swallow small lumps of ice at frequent intervals. The most efficient medicines are gallic acid or acetate of lead in full doses, combined with opium; oil of turpentine, tincture of steel, or ergotin subcutaneously. Ice may be applied carefully over the epigastrium. It is very important to check any violent efforts at vomiting by means of hydrocyanic acid with mucilage, morphia internally or by subcutaneous injection, or an enema containing tincture of opium, at the same time a sinapism being applied over the epigastrium. In cases of capillary hæmorrhage dependent on congestion of the stomach from portal obstruction, a saline purgative is useful, or an aperient enema. Should stimulants be required, they are best administered by enemata. Vicarious hæmorrhage must be treated according to ordinary principles.—FREDERICC T. ROBERTS.

HÆMATIDROSIS.—Hæmatidrosis, or "bloody sweat," is an affection of rare occurrence. It is a hæmorrhage on the surface of the skin in parts where the cuticle is thin and delicate, and it is produced by rupture of capillaries in the plexus round the mouths of the sweat ducts.

The "stigmata" on the forehead, hands, and feet, stated to occur in the persons of religious fanatics, have proved in most cases, when submitted to a careful scientific examination, to be fictitious.—MALCOLM MORRIS.

HÆMATINURIA—*See Urine, Abnormal Conditions of.*

HÆMATOCELE.—Effusion of blood into tunica vaginalis. Sometimes unnecessarily classified into traumatic and spontaneous. Almost always traumatic, the *cause* being a blow or puncture. It is likely that hæmatocele is often caused by a rupture of a varicosed vein. Slight violence is in many cases sufficient to produce this. Witness the cause of Miss Neilson's death—ruptured varix of Fallopian tube during an attack of gastralgia. Hence blood escaped into peritoneal cavity. When a varicocele ruptures, the blood fortunately is more likely to enter a less important serous sac, the tunica vaginalis.

Pathology.—Tunica vaginalis contains blood, which usually remains fluid, only becoming gradually darker and thicker and full of fibrinous shreds. Sometimes it coagulates more or less. Tunica vaginalis thickens. At any period inflammation and suppuration may supervene.

Symptoms.—Gradual but rapid formation of a smooth, globular or pyriform, hard or semi-fluctuating, non-transparent, heavy tumor. Testicle situated usually below and behind; on firm pressure in that region, the peculiar testicular pain is felt. Marks of bruising may appear in skin. Painless, except when quite recent.

Diagnosis.—From 1, solid innocent enlargement of testis; 2, solid malignant tumor of testis; 3, hydrocele. Case 1. Chronic orchitis begins usually with acute orchitis, or there is a history of syphilis or scrofula; it comes on more gradually than hæmatocele. Case 2. Cancer begins more gradually, but enlarges more persistently, and is painful; lumbar glands enlarge sooner or later in cancer. In both chronic orchitis and cancer, thickening of cord is common. Case 3. As even hydroceles may be opaque, unless there is a history of severe violence followed by a sudden swelling and ecchymosis, a final diagnosis cannot be made without the trocar.

Prognosis.—Only mild and recent cases offer any reasonable hope of absorption. Old cases, after reaching a certain size, usually remain stationary. Inflammation may occur at any time.

Treatment.—1. When hæmatocele is recent. Rest in bed, application of cold, elevation of pelvis and scrotum. 2. Later: tap with trocar and canula, and then support with pressure. 3. In old cases with thick walls, or in any case when suppuration occurs, incise freely and empty. Do this antiseptically. Operation not without danger. Hæmatocele of the tunica vaginalis of the cord occurs but very rarely. Symptoms, etc., can be easily inferred. Blow on part, ecchymosis, swelling, etc.—C. B. KEETLEY.

HÆMATOCELE, Pelvic.—EXTRAPERITONEAL HÆMATOCELE.—*Definition.*—A symptom of disease which consists in the outpouring of blood into the extraperitoneal connective tissue.

Causes.—The period of the catamenial nisus; plethora, with rupture of some pelvic vessel; chronic uterine or ovarian disease; hæmorrhagic diathesis; strain on elbow; excessive coitus.

Symptoms.—Severe pain in the pelvis, sense of weight and fulness, faintness, nausea and vomiting, metrorrhagia (?), tympanites, interference with functions of bladder and rectum, fever.

Signs.—A tumor low in the pelvis, usually behind the uterus; not much constitutional disturbance; no peritonitis, uterus pushed upwards, vaginal mucous membrane dusky.

Diagnosis.—From pelvic cellulitis by more rapid development, and primary softness of tumor; from retroversion by absence of signs of hæmorrhage, and absence of alteration on passage of uterine sound; from extrauterine pregnancy by absence of signs of pregnancy, and rapid development; from fibrous tumor by rapidity of growth, and immobility with the uterus; from dislocated ovary by absence of tenderness; from cancer by absence of the characteristic pain and cachexia.

Prognosis.—Usually favorable, as the hæmorrhage is circumscribed.

Complications may arise, as pelvic cellulitis, or peritonitis; uterus may be displaced and fixed.

Treatment.—Check further loss of blood, prevent death, and relieve pain. Perfect rest, ice over hypogastrium, then alcohol and opium. If there is no danger of the rupture of the blood-sac into the cavity of the peritoneum, do not puncture. Leeches may be applied to the hypogastrium, and afterwards a blister. Iodide of potassium (gr. 5) and quinine with iron.

INTRAPERITONEAL HAEMATOCELE.—*Definition.*—A symptom of disease which results in the outpouring of blood into the cavity of the peritoneum. *Causes.*—The menstrual molimen with regurgitation through the orifice of the oviduct; rupture of extrauterine pregnancy by blows, etc., and otherwise as in the extraperitoneal variety. *Symptoms.*—Suddenness and otherwise as in the former disease, extra-peritoneal hæmatocele. *Signs.*—As in former case, but in the intraperitoneal kind the tumor is higher in the pelvis, constitutional disturbance great; bladder and rectum may be interfered with; peritonitis, uterus misplaced, vagina not altogether pressed upon, vaginal mucous membrane not discolored. Otherwise the tumor is, as in the other form, evident to the bimanual examination. *Diagnosis.*—From the extra-peritoneal variety by signs, as above. *Prognosis.*—On the whole favorable, if peritonitis does not supervene. *Treatment.*—As above.—HEYWOOD SMITH.

HÆMATOMA—*See Tumors.*

HÆMATURIA—*See Urine, Abnormal Conditions of.*

HÆMOPHILIA.—Hæmorrhagic Diathesis. A congenital tendency to free bleeding after trifling injuries, or even no injury at all. Mostly hereditary. Want of fresh air, of dry lodging, and of exercise, said to increase the diathesis. Attacks males more than females.

Symptoms and Course.—Bleeding from nose and mouth, with or without obvious exciting cause. Spontaneous ecchymosis beneath the skin. Bleeding often preceded by premonitory symptoms, such as vascular excitement, smell of blood in nostrils, and pains in limbs. In intervals of hæmorrhages, joints swell and even inflame. Loss of blood produces anæmia.

Pathology.—"Probably abnormal thinness of the arterial walls" (Billroth).

Prognosis.—Most patients die young. Some seem to outlive the malady.

Treatment.—Employ every means to strengthen general constitution. To check hæmorrhages use ordinary means, and, in addition, in serious cases, give sodæ sulphatis, ℥ ss., occasionally, and two to five grains of ergot every half-hour. Turpentine in drachm doses. See Legg on Hæmophilia—C. B. KEETLEY..

HÆMOPTYSIS.—*Etiology.*—Hæmoptysis or spitting of blood signifies the discharge of blood through the mouth from any part of the respiratory apparatus below the upper opening of the larynx. The sources of the blood, and the immediate causes of this symptom, may be thus classified: 1. Hæmoptysis independent of obvious local disease. In this group may be included hæmoptysis from going up a height, from severe straining or coughing, or from blowing wind instruments, which is especially apt to occur in those who are delicate, and whose tissues are weak; vicarious hæmoptysis; that due to the inhalation of irritating substances, or to local injury, and that dependent upon an unhealthy state of blood, such as scurvy or purpura. 2. Diseases of the larynx, trachea, or bronchi, for example, congestion, inflammation, ulceration, or morbid growths, especially cancer. 3. Diseases of the lungs, namely, phthisis, cancer, congestion, acute or chronic pneumonia, abscess, gangrene, hydatids. 4. Mediastinal tumors opening into the air-passages, including also glandular enlargements. 5. Cardiac diseases, viz., mitral disease, hypertrophy of the right ventricle, or a weak and dilated left ventricle. 6. Disease of the pulmonary vessels. 7. Aneurism opening into the air-passages. It must be remembered that blood sometimes enters the windpipe from the throat or nose, and is then expectorated.

The blood in hæmoptysis generally comes from the capillaries, but not infrequently a considerable branch of the pulmonary artery either gives way, or is perforated by erosion. In phthisis minute aneurisms have been found upon the branches of this vessel, which have ruptured, and thus originated large hæmorrhages.

There may be no immediate exciting cause of hæmoptysis, or it is brought on by exertion, coughing, or some other disturbance which affects the pulmonary circulation.

Symptoms.—Hæmoptysis may come on without any warning, or is preceded by premonitory symptoms, such as weight or fulness about the chest, dyspnœa, a sense of heat, tickling in the throat, or a saltish taste. Usually the blood is brought up by coughing, but it may rise in gulps without any effort, or sometimes comes in a sudden gush, when it may even escape through the nose as well as through the mouth. Not infrequently vomiting is excited. The quantity of blood varies from a few streaks or a slight admixture in the sputa to an amount sufficient to cause instant death. The blood is generally bright and florid, and more or less frothy, but occasionally it is dark and non-aerated, especially when abundant and suddenly discharged. Clots may be observed, but the greater portion is usually liquid. No change in the blood is evident as a rule, either as regards its general or microscopic characters. The duration of an attack of hæmoptysis varies much, but after the more urgent spmptoms have subsided, the sputa are generally tinged for some time, or fragments of dark clot may be discharged. Recurrence is a frequent event, and in some cases spitting of blood occurs periodically.

If the blood comes from either lung in any quantity, rales of a moist character are generally heard over the corresponding part of the chest.

The effects on the general system will depend upon the amount of blood lost, and the rapidity and duration of its discharge. Death does not often result immediately from hæmoptysis, but may happen either from the direct loss of blood, or from its accumulation in the air passages causing suffocation. Frequently some degree of febrile excitement is associated with hæmoptysis, the pulse being full and bounding, but soft. Should any blood remain in the lungs, it is liable to set up inflammation, and there can be no doubt but that phthisis may be originated in this way.

Diagnosis.—Hæmoptysis may be simulated by bleeding from the mouth or throat, or by epistaxis. The quantity and characters of the blood discharged, the mode of ejection, and, above all, thorough examination of the nose, mouth, and fauces, as well as of the chest, will generally indicate the source of the bleeding. The part of the respiratory apparatus from which the blood escapes can also usually be ascertained by physical examination, and by observing the local symptoms present. Erosion of a large branch of the pulmonary artery is characterized by the discharge of a quantity of dark blood. The diagnosis between hæmoptysis and hæmatemesis is pointed out under the latter. The cause of hæmoptysis can only be determined by a thorough investigation of the case, and a due consideration of all its features.

Treatment.—Hæmoptysis must be treated on the principles applicable to hæmorrhages in general, but in management will necessarily vary according to its cause. Ordinarily, *when the blood* escapes from the lungs, the chief indications which require attention are to keep the patient entirely at rest, in a cool room, in the recumbent posture, with the head rather high; to subdue cough as much as possible, to give ice to suck freely, and to administer astringents, with vascular sedatives. Gallic acid in full doses with opium every two or three hours, acetate of lead and opium, dilute sulphuric acid with alum, turpentine, and ergot of rye, are the most useful remedies. At the Brompton Hospital the gallic acid and opium mixture is usually found very efficacious, and also one containing liquid extract of ergot. The subcutaneous injection of ergotin has of late years deservedly come into much repute. Digitalis is of great value if the heart is acting excitedly. Saline aperients are useful in plethoric patients. Some practitioners have recourse to venesection or local abstraction of blood, but this is rarely a desirable plan of treatment. The application of ice to the chest is often exceedingly beneficial, but it must be done carefully, the ice being removed by degrees. Dry-cupping over the chest is serviceable in some cases. It is sometimes useful, when a case does not yield to ordinary treatment, to draw the blood towards the limbs by means of hot foot-baths or a Junod's boot, or to apply ligatures around the extremities if the patient is sinking from loss of blood, so as to confine the blood to the head and trunk. In extreme cases it might be necessary to have recourse to transfusion of blood. In hæmorrhage vicarious of menstruation, or due to stoppage of bleeding from piles, the application of leeches to the lower extremities, or around the anus is said to do good. In all cases of hæmoptysis to any considerable amount, it is important to keep the patient under observation until any irritation due to the presence of the blood in the lungs has entirely subsided. If there is any tendency to spitting of blood, everything likely to bring on an attack must be avoided; while at the same time the condition of the blood is improved by proper dieting, and by the administration of tincture of steel —FREDERICK T. ROBERTS.

HÆMORRHAGE.—Hæmorrhages are classified in several ways, viz.: firstly, according to their source, into 1, arterial; 2, venous; 3, capillary, and 4, parenchymatous. "Parenchymatous" is a term applied by the Germans to hæmorrhage from the tissues full of small arteries and veins, *e.g.*, the penis and the tongue. Secondly, hæmorrhages are classified, according to the time of their occurrence, into 1, primary (*i.e.*, at time of wound); 2, intermediate or recurrent (within a few hours); 3, secondary (*i.e.*, a few days after wound). A third classification is into 1, traumatic; 2, spontaneous (vide Hæmophilia). Surgeon-major Porter described an intermittent hæmorrhage from malarial influence. Arterial hæmorrhage contrasted with venous hæmorrhage. Arterial is florid and spurts in jets; venous is dark, and either does not spurt rhythmically at all or does so only in relation with the acts of respiration. Arterial, however, is dark when respiration is interfered with, and venous is florid sometimes, when it wells up from a deep wound and is thus exposed to the air before becoming visible.

Natural Checks to Hæmorrhage.—Arterial hæmorrhage is stopped naturally by 1, active contraction of vessel; 2, passive contraction, consequent on decrease of total quantity of blood in system; 3, weakening of heart caused by loss of blood; 4, obstruction of vessel by clot. The first three are, one or other, more or less, accessory to the operation of the fourth cause. Venous hæmorrhage is stopped partly by cause similar to those which check arterial hæmorrhage, and partly by the action of the valves in the veins. Capillary hæmorrhage is stopped by the contraction of the connective or other tissues in which the vessels are embedded, and by coagulation. Hence, when these tissues are diseased, capillary and also parenchymatous hæmorrhage may be very troublesome.

Pathology.—Natural changes in and around a wounded vessel. a. If wound be partial and transverse, the wound gapes; bleeding is considerable and has to be checked ultimately by clotting, which may not occur till syncope comes on and predisposes to it. *b.* Wound longitudinal. Wound does not tend to gape. Hæmorrhage is, therefore, more easily checked by coagulation and contraction. *c.* Wound completely divided artery. 1, The ends of the artery retract into the sheath, sometimes curling or twisting up; 2, the ends contract; 3, coagulation takes place within the artery; 4, coagulation occurs outside the artery, within and sometimes without the sheath; 5, organization of the clot or part of it; finally, cicatricial contraction occurs in the newly-organized tissue. Recurrent hemorrhages are caused by the returning force of the circulation, which, when a patient becomes warm in bed, may be enough to open a vessel not firmly closed.

General Symptoms of Hæmorrhage.—1, Face first pale, then blue; 2, pulse sinks; 3, temperature sinks; 4, dizziness; 5, nausea or vomiting; 6, eyes dazzled; 7, noises in ears; 8, fainting and unconsciousness; 9, either the patient recovers or gets worse. In the latter event the following set of symptoms are noticed: 1, face waxy; 2, lips blue, 3, eyes dull; 4, body cold; 5, pulse thready, frequent; 6, breathing incomplete; 7, repeated swooning; 8, permanent unconsciousness; 9, twitching of arms and legs; then death.

Treatment.—Many cases require great decision, sound anatomical knowledge, and sanguine courage for their proper treatment. Classification of local remedies, seven chief classes, viz.: 1, ligature; 2, torsion; 3, acupressure; 4, compression; 5, flexion; 6, styptics; 7, position.

Ligature.—Divided into—1, ligature at the bleeding point, and 2, ligature of the artery above the wound, *i.e.*, ligature "in the continuity." General rule.—In case of a vessel being wounded, cut down to the wounded point, tie the vessel, immediately above and below the wound. But in some cases, such an operation would involve a deep and large incision, *e.g.*, in hæmorrhage from upper part of posterior tibial artery; and in other cases, the artery is diseased at the spot bleeding. In such cases the artery is often tied in the continuity. Materials used: silk, hemp, catgut. Operation.—Instruments required are scalpel, forceps, retractors, director, artery forceps (occasionally, also, aneurism needle), tenaculum. In tying an artery at the spot wounded, a sufficiently free incision should be made (usually by enlarging the wound which leads down to the artery), and then each end of the bleeding artery should be seized and ligatured if the vessel has been divided completely. But if the vessel has been only punctured, two ligatures must be applied with the aneurism needle, one above and the other below the wound. Secure the ligature with a reef-knot, pulling each end of the knot tight with the tips of the forefingers pressed against it; unless catgut be used, one end of the ligature is left hanging out of the wound. To tie the artery in the continuity, see the directions given under the head of Aneurism. *Pathology; the effect of ligature.*—Internal and middle coats, divided, curl up within external plug of fibrin. Inflammatory new formation (*i.e.*, escape of leucocytes from blood-vessels into and around clot and arterial coats, and their organization into fibrous tissue.) Tied artery eventually dwindles into fibrous cord.

Torsion.—Bryant's directions are: "The vessel should be drawn out, as in the application of the ligature, and three or more sharp rotations of the forceps made. In large arteries, such as the femoral, the rotation should be repeated till the sense of resistance has ceased; the ends should not be twisted off. In small arteries the number of rotations is of no importance, and their ends may be twisted off or not, as the surgeon prefers." "When the vessels are atheromatous, or diseased, fewer rotations of the forceps are required, the inner tunics of the vessels being so brittle as to break up at once and incurve." The effects of torsion practically resemble those of ligature, but the inner coats curl up more in the former case, sometimes forming a regular valve. Though torsion leaves no dead foreign body in the wound like a piece of ligature, yet the bruised end of a twisted artery is less likely to live and form adhesions than the less damaged end of a ligatured artery.

Acupressure has been noticed separately. See Acupressure.

Compression.—Several forms:—1. Tourniquet; 2, digital; 3, ordinary bandages with or without graduated compress; 4, elastic bandaging. Chief kinds of tourniquet are Petit's and Signorini's; Petit's is most used for operations, and consists of a webbing band, with a pad and a screw for tightening. It is usual to place a small compress, made of a small soft roll of bandage or of lint, over the artery to be compressed. Signorini's tourniquet is used chiefly in the treatment of aneurism, and it consists of two curved metal arms, with a screw hinge between the two, and a pad for the artery at the extremity of one. Lister's tourniquet for the abdominal aorta, is on the principle of Signorini's. In applying any tourniquet it is necessary to adjust it with great deliberation and care, otherwise the pad is liable to slip off the artery. One should mention here the lever used by Davy, with great success, to compress the iliac arteries, per rectum. Digital compression is preferable in almost any case, 1, because of the liability of all instruments to slip out of place; 2, because the human finger is so delicate, tender, and elastic when compared with a rigid tourniquet or bandage. But it is difficult to obtain for this purpose, and expensive of time and labor. In some cases, *e.g.*, hæmorrhage from internal carotid into pharynx, no other form of compression might be applicable. Digital is often supplemented by the compression of a small sand-bag, placed upon the finger, which sand-bag supplies the place of muscular force. *Bandaging.*—In arterial hæmorrhage from a limb, if an attempt be made to check it by the bandage and compress, the joints should be flexed and the whole limb bandaged. There is a form of compression called "plugging;" for instance, if a gluteal aneurism were opened freely in mistake for abscess, the proximal end of the artery would very likely be in the pelvis and inaccessible; then the aneurism would have to be stuffed with lint and the pelvis bandaged, pro tem., whilst further measures were considered or undertaken.

Flexion.—Is closely allied to compression, and should almost always be combined with it. One objection to flexion is the disagreeably constrained position often unavoidable. To demonstrate the value of flexion, bend the elbow strongly and feel the pulse at the wrist; it will be scarcely perceptible.

Styptics.—1, heat; 2, cold; 3, drugs, *e.g.*, iron, tannic acid, gallic acid, catechu, alum, matico, and many others. *Heat.*—The actual cautery is the only form in which the books speak of heat as a styptic; but, years ago, before commencing the study of medicine, I accidentally observed the power which very warm, that is decidedly hot water (120° to 140° Fahrenheit) has of closing small bleeding vessels. In hæmorrhages from mucous membranes, for example, those which Billroth calls "parenchymatous," I believe hot water to be more effectual than cold; so also in oozing from wounds. In major amputations it should be preferable because it is less depressing than cold.[*] The actual cautery should be used at a black heat, and held close to but not touching the bleeding part. It causes an eschar with a suppurating surface beneath. Cold is applied chiefly in the form of ice or iced water. The most powerful styptic drug is perchloride of iron. The strongest tincture is usually employed, and it is often made to saturate a compress. Thus styptics, pressure, and flexion can all be combined if desirable. Billroth speaks of turpentine as a most effective but painful and heroic styptic. The above remedies should be supplemented by elevation of the part, general rest, and avoidance of anything likely to excite the patient's circulation. *General Treatment.*—Is indicated for the faintness and weakness caused by hæmorrhage. Horizontal pressure, ammonia, ether, wine. The application of Esmarch's bandage to a limb has been suggested, to drive more blood into the vital centres. (Wharry). Transfusion. See Transfusion.

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[*] See Practitioner, Feb., 1879.

SECONDARY HÆMORRHAGE.—Its causes are: 1, defect in the ligature itself; 2, defect in the manner of tying it; 3, the ligature's having been applied too near an offset of the artery, so that collateral circulation has prevented the formation of the usual fibrinous plug; 4, atheroma; 5, suppuration or sloughing of the wall of the artery, which suppuration or sloughing is sometimes the result of a contusion and sometimes of erysipelas; 6, vascular excitement. The approach of secondary hæmorrhage is usually insidious, but it is frequently very sudden, and may be fatal even in a few minutes if the artery be large. *Treatment of Secondary Hæmorrhage.*—Never delay or temporize in these cases. The first thing to be tried is pressure, and if properly applied it will rarely fail. The mode of application must necessarily vary with the case, only it should always be firm and uniform; the bandages, unless elastic, should be starched; the compresses over the bleeding point should be carefully graduated, and, if the bleeding artery be in a limb, the bandage should cover the whole of the limb. With pressure should be combined perfect rest, elevation, and flexion. To secure rest, splints are sometimes useful. For vascular excitement, give vascular sedatives, *e.g.*, tinct. digitalis. Vide Treatment of Hæmorrhage in general. When these means fail, the choice lies between ligature of the bleeding vessel and the bleeding point, ligature of the artery in the continuity, digital pressure, and amputation of the limb. Some cases are adapted for the use of the actual cautery, of styptics, or of acupressure. Ligature of the artery in the continuity is to be deprecated, because it is liable to be followed by gangrene, and is, moreover, far from a certain remedy. Ligature at the bleeding point is often useless, because the tissues are there so diseased, or it is objectionable because it would involve opening up a large stump nearly healed. Digital pressure is not always readily obtainable. Certain cases are suitable for amputation. The cases are secondary hæmorrhage from the main arteries from the lower extremity, when pressure, rest, elevation, flexion, and re-tying at the bleeding point have failed. In such cases, tying the main artery in the continuity is very liable to be followed by gangrene, and re-tying at the bleeding point is often impossible from the depth of the wound and the state of the tissues.—C. B. KEETLEY.

HÆMORRHAGE, Accidental, in Labor.—*Definition.*—Hæmorrhage, the result of partial detachment of the placenta from its normal situation, the source of bleeding being from the uterine sinuses.

Causes.—Violent emotion, blows, jerks, straining, or accidental dislodgement during the progress of labor.

Symptoms.—Fainting, collapse, dull pain over the fundus uteri, partial cessation of pains, hæmorrhage especially between the pains.

Signs.—A doughy feel of that portion of the uterus where the placenta is detached, specially marked if the hæmorrhage is concealed; pulse small and feeble.

Diagnosis.—From inertia uteri by the pain and the bleeding, and by the pains, if present, being still effectual.

Prognosis.—Unfavorable if concealed, if it have existed for some time before the hæmorrhage becomes manifest, leading to the formation of a clot on the walls of the uterus which becomes adherent and difficult to remove, eventually becoming a source of septic mischief; favorable if discovered and treated early.

Treatment.—Rupture the membranes and hasten delivery; wash out the uterus daily with Condy and water, or iodine and water.—Heywood Smith.

HÆMORRHAGE, Unavoidable, in Labor.—*Definition.*—Hæmorrhage, the result of partial detachment of the placenta in the progress of labor, when the placenta is situate partially or wholly over the os uteri.

Causes.—The abnormal situation of the placenta.

Symptoms.—Hæmorrhage at the sixth, seventh, eighth or ninth month, or at each of these periods successively.

Signs.—The hæmorrhage is nearly continuous and is augmented during the pains; on examination the placenta is felt to be presenting.

Prognosis.—Often unfavorable.

Treatment.—If the os uteri is not sufficiently open for delivery, plug the vagina carefully through a speculum for several hours; give nourishment. On removing the plug, if the os uteri is opening, dilate with the hand and deliver by turning. The best method of plugging the vagina is by means of a contrivance called the kite-tail plug. Plugs of cotton-wool are tied at intervals of a few inches, say six or eight, on one piece of string; they are then packed into the vagina one by one through the speculum. The advantage of this method is the facility of removal, for on pulling the string the plugs come out one by one in the inverse order of their introduction.—Heywood Smith.

HÆMORRHOIDS.—Are essentially varices of the inferior hæmorrhoid veins. Three varieties, viz., 1, external; 2, internal; 3, interno-external.

Causes.—(*a*) Predisposing: everything which congests the portal system or the hæmorrhoidal tributaries of that system. Constipation, high living, sedentary habits, liver complaints, indigestion, feeble circulation, inflammatory disease of the rectum or other pelvic or perineal parts, *e. g.*, fistula; pregnancy, relaxing climate. Early manhood and middle age. Uncommon in young women. (*b*) exciting causes: various forms of local irritation; fits of intemperance in eating or drinking, dirt, use of rough irritating material for the person, sitting on cold slabs, drastic purgatives. It will be observed that no sharp line separates some of the exciting from some of the predisposing causes.

Pathology.—All piles at first are merely local congestions or vascular dilatations; but eventually the blood clots in some part of them, and the connective tissue and vessels contained in them hypertrophy. Usually a small artery lies in the centre. External piles vary greatly in appearance, according as they are swollen or contracted. In the former case they are almost globular and tense; in the latter they may be so shrivelled up as to look like mere folds of thickened skin. Internal piles are classified into, 1, longitudinal or fleshy, and, 2, globular. The former are usually "blind," that is, not bleeding; the latter are bleeding piles. The former are sessile and dusky; the latter are more vascular, and therefore blue or red, and often pedunculated. The relative proportion of arterial, venous and fibrous material in piles varies greatly. Superficial excoriation and ulceration common. Liability also to inflammation and strangulation.

Symptoms.—Itching, irritation and discomfort; then tenesmus, pain in lumbo-sacral region and in testicles; irritability of bladder, disturbed nights, miserable bodily condition, and pinched-up countenance. When there is hæmorrhage to any extent, anæmia, sometimes to the utmost degree, ensues. Hæmorrhage often periodical: arterial or venous or capillary, trifling or moderate, or sudden, copious and most injurious. Mucous or muco-purulent discharge. The latter indicates ulceration.

Complications.—Fistula, fissure, prolapsus, and the various diseases which are so often the predisposing causes of the piles themselves.

Diagnosis.—From prolapsus, polypus, and condylomata. *Vide* these diseases and compare symptoms.

Treatment.—Remove cause if possible. Some cases obviously require operation; others can plainly be cured by gentler means. In a third class of cases, milder treatment should be tried first; operation afterwards if necessary. General treatment: gentle exercise alternating with rest on a cool hard couch; temperate diet; gentle purgatives: conf. sennæ co., sulphur, cream of tartar, Friedrichshall, Pullna, Hunyadi, Janos, &c. Enemata of cold water. Conf. piperis co. Conf. pip. co. should always be combined with or followed by a laxative. Tonics in suitable cases. Blue pill, taraxacum, &c., for the liver. Glycerine in ʒ j doses. When the piles have been cured, but anæmia remains, give mist. ferri co. or pil. ferri co. freely. Local treatment: I. non-operative. Cleanliness, but avoid irritating soaps: glycerine soap and warm water; cold water. If piles prolapse at stool, return at once. Astringents: ung. gallæ co. Astringent injections. Quantity: two ounces nightly. Strength: tinct. ferri perchlor. mm. x-aquæ ʒ j. Suppositoria acidi tannici. For inflamed piles: foment, poultice, leech the neighborhood of the pile. When a large clot forms in a pile, incise pile and turn out clot. Suppurating piles: puncture when mature. Strangulated piles: reduce gently. Relieve pain on general surgical principles. II. Operative treatment: external piles are excised; internal are removed by, 1, ligature; 2, cautery; 3, nitric acid. *Excision of external piles.*—Seize with vulsellum forceps, clamp, snip off with scissors curved on the flat, pass a cautery lightly over stump, unclamp; snip off any pendulous little fold of skin; pad of oiled lint; T-bandage. *Ligature of internal piles.*—Let the nurse empty patient's rectum with an enema shortly before operation. Patient should sit over warm water, to relax the parts and make it easier to protrude the piles. He then lies on one side and draws up his knees. Seize each tumor with pile forceps, cut through that side of it next the skin with scissors, surround base of tumor with a hempen thread, tie the pile very tightly. Cut ends of ligature short, oil well and push back the ligatured mass within the anus again. Ligature separates in about a week. An anodyne is to be given after the operation, and a laxative on the second day. Anæsthesia often dispensed with. Dress with dry cotton wool. *Cauterization of internal piles.*—Preparation same as for ligature. Smith's clamp, ivory side downwards, snip off piles with scissors, sear bases with actual or with galvanic cautery. Latter said to cause least after-pain. Unclamp gradually, and cauterize any bleeding point. Suppository of morphia. Usual to anæsthetize during this operation. After-treatment same as for ligature. Recovery quicker. Danger about the same, but in either case very little. *Nitric acid.*—Suitable for sessile hæmorrhoids. Apply with a piece of wood through speculum. Concave clamp to protect healthy mucous membrane. Galvanic cautery applied lightly answers admirably for sessile hæmorrhoids.

NOTE.—When operating for hæmorrhoids, avoid as much as possible damaging the line where the mucous membrane joins the skin. When there is a fissure, operate on it first.—C. B. KEETLEY.

HAMMER TOE—*See Toes, Diseases of.*

HAND, Deformities of (inclusive of fingers). Four classes, viz.:—1, Deficiency; 2, excess; 3, webbed fingers; 4, contractions. It is rare to find a finger or any part of the hand congenitally deficient.

Supernumerary fingers are frequent: one is the common number, and it lies usually on ulnar side of little finger. Thumb may be bifid, or there may be a supernumerary thumb. A finger may be too long or too short. A very rare deformity is a double hand on the same wrist.

Contractions.—Four classes: 1, Congenital; 2 paralytic; 3, traumatic or cicatricial; 4, rheumatic.

Congenital contraction assumes the form called "clubbed hand," which is analogous to clubbed foot, but very rare.

Rheumatic contraction bends the fingers upon the palm and is practically the most important deformity of the hand.

Causes.—Either chronic rheumatic diathesis, or the habit of pressing on some round-headed instrument, like a chisel or a walking-stick.

Signs.—One or more fingers, especially the little one, is flexed, a tense subcutaneous fibrous band bridging across from it to the palm.

Pathology.—Chronic inflammatory thickening and contraction of fibrous tissue between palmar fascia and sheaths of flexor tendons.

Treatment.—Supernumerary fingers should be amputated. As their proximal joint sometimes communicates with one of the normal metacarpo-phalangeal articulations, in such a case the base of the supernumerary finger may be left. If the operation is done at an early age this stump will not grow.

Clubbed hands can only be treated on the same principles as clubbed foot, but with not nearly the same hope of success.

Treat rheumatic contractions in this way: Divide subcutaneously, if possible, or else antiseptically, the contracted fibrous bands; carefully avoiding any injury to sheaths of tendons. Then extend fingers on a splint. Attend to the cause. See Adams's little book on this subject.

Webbed fingers, unless ingeniously treated, reunite after being cut apart. Method 1. Pass a metal ring through the base of the web, and keep it there till the aperture cicatrizes. Then complete the separation. Method 2. Wrap a flap of skin taken from the back of one finger over the raw surface of the other finger, and another flap of skin taken from the palmar surface of the latter finger over the raw surface of the former, utilizing, of course, the skin of the web itself. Method 3. Vide Barwell, *Medical Press and Circular*, 1866, or Holmes's System, v. 825. In this skin is taken from the buttock. Method 4 Gradual strangulation of the web by a clamp.—C. B KEETLEY.

HANGING—*See Asphyxia.*

HARE-LIP.—*Causes and Pathology.*—Congenital. Many degrees of this deformity. Single hare-lip and double hare-lip. The fissure is not central, but corresponds in single hare-lip to one side and in double hare-lip to both sides of the inter-maxillary bones. The inter-maxillary are the bones which form the front of the hard palate and alveoli carrying upper incisor teeth. Hare-lips vary in depth from a mere notch in the edge of the upper lip to a total separation of the inter-maxillary bones. The deformity in hare-lip is homologous to a fissure which is normal in some fishes, but it has no homology with the cleft in the lip of a hare. It often co-exists with cleft palate. Male sex predisposes. Double hare-lip almost always affects boys, and is ten times less common than the single variety. The inter-maxillary bones in double hare-lip often project forward from the end of the nose, and are frequently only half developed in size.

Treatment.—Operative only. Best time, third to fifth month of infancy. Contra-indicated during dentition or ill-health. Plastic operations fail in syphilic (Verneuil.) Chloroform unnecessary and difficult to administer. If desired anæsthetic vapor may be pumped through a catheter. Child in a lying or sitting position on a table, or on nurse's or surgeon's lap. Secure his limbs by rolling him up lightly but firmly in a towel. Assistant to check hæmorrhage by holding each side of the upper lip between his finger and thumb. Surgeon sponges for himself, or lip may be secured in T. Smith's forceps. Begin by separating with the knife the two sides of the lip from the jaw subjacent, unless the former structures be already very free. Then pare the edges of the cleft. Remove enough, especially from the apex of the cleft and from the junction of the cleft with the edge of the lip. Then suture, strap, and put on Hainsby's truss. The incisions are best made with a view to utilizing the "parings" of the fissures, *vide* diagrams in text books. In double hare-lip the whole margin of the inter-maxillary nodule is pared. When this nodule projects, it must, unless it is rudimentary, be broken at the base and bent back to the level of the lip. If it is rudimentary, it may be removed altogether except the skin which covers it anteriorly. This must be stitched back, either to complete the nasal septum if that is deficient, or otherwise fill the gap in the lip. Modes of suture—1, The "hare-lip" suture proper. Two pins. Enter and exit ¼ inch from fissure; pass deeply, nearly reaching mucous membrane. Lower one secures coronary artery. Twisted suture. Interrupted wire suture at red border of lip. Sharp ends of pins nipped off. Pieces of lint placed beneath ends of pins. Strapping, broad at ends and narrow in middle, brought across the lip. 2. The common interrupted wire suture. This answers well for ordinary cases, and is less likely to leave scars. All pins should be removed on third day very gently, the lip being well-supported at the time and strapped immediately afterwards. Act of suckling rather beneficial than otherwise, as it tends to close the fissure. In order to bend back the inter-maxillary bone when it projects, instead of breaking its base it is a better plan to cut a V-shaped piece out of the septum nasi.—C. B. KEETLEY.

HAY ASTHMA.—*Natural History.*—A variety of asthma or catarrh occurring generally during the summer months, especially during the inflorescence of the hay crop, or during the drying and conversion of the newly-mown grass into hay in May and June. In connection with the development of this affection there is usually a susceptibility to the exciting cause, which is some palpable minute emanation from the inflorescence of flowering plants, trees, grasses or fungi. The exciting cause is in the atmosphere. The inhalation of minute particles, such as the powder of ipecacuanha, will produce symptoms resembling this affection; so also will fine dust, the composition of which is unknown, or at least is not known to contain anything so specific as ipecacuanha. The dust of grain or flour has been known to produce the same effect; and at one time mere effluvia or odors were believed so to affect the nervous system as to cause the occurrence of asthmatic fits. The odors of mint, of the rose, various flowers, and other strong perfumes have produced difficulty of breathing, with dry cough, as in hay asthma, in some people. The probability is that the mere mechanical influence of certain minute but specific particles floating in the air may be sufficient in some to cause this disease, as in the case of ipecacuanha, or inflorescence particles of certain grasses, or of the flowers cut down with the grass in the progress of haymaking. Hence, the name ought to be pollen catarrh, or pollen asthma. Such catarrh is often very severe, involving the commencement of the air passages in an acute attack, with much redness of the mucous membrane of the nose and eyelids.

Treatment.—If the pathology of this disease be accepted, which regards it as the result of irritation (specific or mechanical) from fine particles of matter (indefinite dust or specific powder) floating in the air, the use of a respirator of fine cotton, as shown in Professor Tyndall's interesting expositions regarding dust and disease, would absolutely prevent the affection, and ought to be tried by those who suffer from it every year about the months of May and June. Mr. Carrick's apparatus for purifying the air would be also a preventive.—WILLIAM AITKEN.

HEAD, Injuries of the.—Important because almost all varieties are liable to be complicated with cerebral mischief. Classification is primarily anatomical. 1, scalp injuries; 2, fractures of skull; 3, injuries of brain and its membranes; 4, injuries of cranial nerves.

I. Scalp may be contused or wounded, or both. CONTUSIONS OF SCALP. Very common. Extravasation may be diffused or circumscribed. Circumscribed extravasation occurs either, 1, above cranial aponeurosis, 2, just beneath it, or, 3, between epicranium and bone. A special kind of scalp extravasation is Cephalhæmatoma, which lies mostly just beneath epicranial aponeurosis, and very rarely beneath epicranium. *Signs.* Fluctuation, hard and thickened margin, soft centre, rarely any discoloration. Cephalhæmatoma occurs in the newly born, and is caused by pressure of maternal pasages or of obstetric forceps. Its usual situation is over the parietal bone. *Fluid contents.*—Blood with its corpuscles more or less disintegrated, its coloring matter more or less diffused, and perhaps partly crystallized, while its plasma is often partly coagulated. The coagulation may entangle the coloring matter and leave the fluid contents pale and yellow. *Diagnosis.* From fracture. The hardened margin of an extravasation can usually be deeply pitted by steady and continued pressure. See Fracture. *Treatment.*—Cold and pressure. Afterwards discutient lotions (lotio ammonii chloridi, &c.) Only the most obstinate cases should be aspirated or punctured by a small knife. After puncture apply antiseptic dressings. When suppuration occurs, open freely and poultice. *Scalp, wounds of.*—Often contused and lacerated. *Prognosis.*—Very good even in the most severe cases, because the vessels of the scalp lie chiefly superficial to the aponeurosis. But, for the same reason, the blood-supply of the cranium is sufficiently interrupted in extensive lacerations to cause danger of necrosis with its consequences. Other dangers in scalp wounds are erysipelas, and accumulation of pus, causing puffy swelling. *Treatment.*—Clean carefully and replace flaps accurately. Use sutures if necessary, but do not pass them through the aponeurosis. Experience of American civil war was in favor of sutures (*Med. and Surg. Hist. War of Rebellion*). Dressing should be just enough to support and protect from drafts of cold air, without heating. Bleeding vessels can sometimes be conveniently secured between a needle and twisted suture. Treat complications on general principles, giving free exit for pus, &c.

II. FRACTURES OF SKULL. Classified in three ways. Firstly, into simple and compound. Secondly, into fractures of the vault and fracture of the base. Thirdly, according to the physical characters of the fracture, into fissures, starred, depressed, punctured, elevated, and comminuted fractures. It should also be noted, when possible, what is the relative amount of damage done to the inner and outer tables of the skull. *Causes.*

Blows and falls on the head, and though very rarely, indirect violence, viz., falls on the feet or blows on the lower jaw. The nature of the fracture naturally depends greatly on the cause. See pathology following. *Anatomy and Pathology.*—Position of fracture. This depends chiefly on point where the causative force has been applied, and on nature of force. Sharp instruments cause depressed fractures at the point of contact. Sometimes they only crack the outer table, while they depress the inner. Heavy, softish bodies, *e. g.*, a bale of cotton, are likely to cause fractures of the base. The skull has been divided into three "zones," and evidence given to show that a blow on the vault of one zone is likely to cause a fracture of the base of the same zone. The middle zone consists of "the parietals, the squamous, and the anterior surface of the petrous portions of the temporals, with the greater part of the basisphenoid." The posterior and anterior zones include the rest of the skull. The middle zone is the commonest seat of fracture. Shape of fracture; vide classification. A very common shape is a depression with three triangular sides sloping downwards till their apices meet in the centre of the depression. In fractures of the base, sutures,—*e. g.*, the petroso-occipital—are sometimes torn open. Most fractures of the base are continuations of fissures of some part of the vault. But a few appear to be genuine cases of contre-coup. This is what is meant by contre-coup. Suppose a watch lying with its face towards the table, and a weight to fall upon the back of the watch. If the glass cracked, that would be a fracture by contre-coup. In some of these cases, the base of the skull is said to be broken by contusion with the atlas. One table is usually more damaged than the other, and the least damaged lies towards the surface where the violence has been applied, therefore the most damaged is almost always the inner table. Extravasations within the cranium, damage to internal and middle ears, and to cerebral centers and nerves, as well as membranes of brain, very common. *Signs and Diagnosis.*—Obvious in compound fractures with depression. In compound fractures without depression, fissure looks like a red line. One of the sutures must not be mistaken for a fissure. Simple fractures without depression can only be recognized or suspected indirectly through their complications. Simple fractures with depression have to be distinguished from contusion with thick, hard margins. The depression in fracture is generally more abrupt at one part of its margin than another, while the hard margin of a contusion is usually tolerably circular and uniform, as well as impressionable by steady pressure with the finger. Fractures of frontal sinuses, or of mastoid cells, often cause emphysema. *Signs of fracture of the base of the skull.*—Bleeding from ear, nose, or mouth, escape of cerebro-spinal fluid from the ear,[*] sub-conjunctival ecchymosis, paralysis of cranial nerves, especially of seventh pair. Tenderness of mastoid process and ecchymosis in suboccipital region indicate fracture of posterior fossa, unless direct violence has been applied to the tender and bruised parts. The anatomical explanation of the above symptoms is obvious. Hæmorrhage from the ear is the commonest of them. A Somewhat rare symptom of fractured skull is escape of brain-matter. Cerebro-spinal fluid is very watery, saline, and contains only a trace of albumen, and the faintest trace of sugar. When such a fluid escapes from the ear directly after an injury, it is pathognomonic of fracture of the base. Amount of fluid sometimes very considerable.[†] In diagnosing fracture of the skull, always consider the brain-symptoms, if such are present, and consider also the nature of the force which caused the accident. Serious and long-continued cerebral symptoms following a heavy blow on the head are usually caused by fracture and its complications. *Prognosis.*—Depends usually altogether upon the amount of injury done to the brain. In estimating this, consider the cause, the situation, and the shape of the fracture, the age, habits, and health of the patient. The injury done by sharp instruments is generally local and pretty manifest to the surgeon's senses. Heavy, blunt, soft bodies are apt to severely concuss and contuse the brain and fracture the base of the skull, while causing very little superficial damage. Fractures of the base are usually, but not always, fatal. Fractures with escape of brain-matter have been recovered from. Fracture at root of nose may only affect anterior wall of frontal sinus. Young children have no frontal sinus. Depressed, and especially punctured fractures, very liable to wound dura mater and brain. Kidney disease makes wounds in this, as in other regions, very serious. *Treatment.*—In all cases, rest, coolness, low diet, high, hard pillows beneath head. Ice locally, a purgative at commencement. Vigorous antiphlogistic treatment the moment signs of inflammation appear. Leeches. Cold douche. Continue observation of simple cases at least a month. Remove loose, depressed pieces in comminuted fracture. *Indications for Trephining.*—They are simply the occurrence and persistence, in spite of treatment, of symptoms of local intracranial suppuration, or hæmorrhage, or of cerebral irritation, after a blow on the skull. Trephining is contra-indicated in cases of diffused injury to the brain, and even in cases of depressed fracture unattended by cerebral symptoms. (Vide Gamgee, in *Brit. Med. Journal*, 1877.) Bryant is "almost tempted to believe that depressed bone by itself never gives rise to marked symptoms of compression, and that when these are present hæmorrhage exists with it." When there is a depressed fracture, it is right to trephine as soon as ever cerebral symptoms appear. Otherwise, ice-bags, &c., should have a fair trial first. When there is comminution, depressed pieces can sometimes be raised by the elevator or forceps only. See article Trephining. Further points are touched upon in the next section, which is about.

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[*] In rare cases, cerebo-spinal fluid has been known to flow from nose or from a fracture of the vertex.

[†] E. W, Collins (*Dub. Med. Journ.* Feb. '77) demonstrates that (1) sugar is not constant in the fluid; (2) when present, though reacting to Trommer's, Moore's, and Bottgen's tests, it usually does not deflect polarized light, or ferment with yeast; (3) three constant characters of cerebro-spinal fluid are (1) very low sp. grav., (2) almost complete absence of albumen, (3) comparatively large proportion of sodium chloride.

III. Injuries of the Brain and its Membranes.—These include extravasations of blood within the cranium, contusion and laceration, inflammation and suppuration of traumatic origin, hernia cerebri; and here also must be noticed the conditions styled "concussion" and "depression."

Extravasations of Blood within the Cranium.—1, Between dura mater and bone; 2, in cavity of arachnoid; 3, on the surface of the brain between it and the arachnoid; 4, in the substance of the brain or in its ventricles. 1, Extravasation between dura mater and bone. *Causes.*—Wounded blood-vessel, usually a branch of middle meningeal artery, sometimes a wounded sinus, especially the lateral sinus. *Pathology.*—The effused blood forms a clot, often of enormous size and having very little tendency either to be absorbed or to become encysted. This clot, when large, causes a corresponding depression on the surface of the brain. *Signs.*—May be *nil* if clot be small, or even in the case of a large hæmorrhage, if it be poured out so gradually that "the brain has time to accommodate itself to the pressure." When symptoms are present they are those of compression or of irritation. The most valuable evidence of extravasation exists when symptoms of compression come on, not immediately after an injury, but after an interval of cousciousness. For prognosis, treatment, etc., *see* paragraphs about *Compression.* It is to be noted that irritation of the nerves of the dura mater causes reflex convulsions and contractures of the same side of the body as the injury to the head. 2, Extravasation in cavity of arachnoid. Very common. *Pathology.*—When not absorbed has a tendency to form blood-cysts contained in a new fibro-serous membrane which is attached to the parietal layer of the arachnoid, and makes a depression on the surface of the brain. *Signs and diagnosis.*—Cannot be distinguished from other intra-cranial hæmorrhages. Long after the original injury, it is liable to cause headaches and mental irritability. *Treatment, etc., see Compression* and *Cerebral Irritation.*—3, Extravasation on surface of brain, beneath visceral arachnoid. Accompanies general cerebral injuries. Never encysted. May spread very widely. No special signs. No special treatment. 4, Extravasations into substance of brain or into its ventricles. Not to be distinguished from apoplexy except by the history. *Treatment, etc.*, as in Apoplexy.

Contusion and Laceration of Brain.—Pathological Anatomy.—Minute extravasations, sometimes few, sometimes numerous, sometimes occupying only a limited portion of gray matter, sometimes diffused through greater part of brain; sometimes attended with very little injury to cerebral substance, sometimes followed by complete softening and disintegration, or, after a longer interval of time, by atrophy of brain-substance. Situation often opposite the part of cranium struck (contre-coup). Usually middle or anterior fossa of base. Lacerations are often complicated with large extravasations. *Symptoms.*—Partial spasms and paralysis, occasionally coma. Frequently concussion. None of these symptoms belong specially to cerebral contusion and laceration, which are so difficult to diagnose satisfactorily that their treatment, etc., will best be considered under the heads of concussion, compression, cerebral inflammation, irritation, etc.

Encephalitis, Traumatic.—This includes meningitis, for, during life, inflammation of the membranes cannot be diagnosed from that of the brain-substance; though a shrewd guess may sometimes be formed by considering the exciting cause. Classified into, 1, acute, and 2, sub-acute or chronic. *Causes.*—All injuries of the head. For even a scalp wound may excite firstly, osteitis, and secondarily, meningitis and cerebritis. Neglect of rest and of temperance after head-injuries is very likely to excite inflammation. *Pathology.*—Congestion of the parts inflamed. Firstly, yellowish lymph and then pus appears on the inflamed membranes. Cerebral substance may soften and break down. Serous effusion into ventricles. When the exciting injury is not very deep, *e. g.* most punctured fractures, the membranes are chiefly affected; but when it is general or deep. *e. g.* contusion of brain, the cerebral substance may be the chief seat of inflammation. Although the appearances are most marked at the actual seat of injury, yet traumatic encephalitis generally spreads to a great part of the brain and its membranes. In chronic cases, parietal and visceral layers of arachnoid cohere. The amount of cerebral congestion is estimated post mortem by the number and size of the red points visible on section of the hemispheres. This test is not satisfactory, for it is influenced by the relative fluidity of the blood and the pressure of serous effusion in the ventricles. *Signs.*—1, Acute. Severe pain in head, over-sensitiveness to light and sound, noises in ears, one or both pupils contracted, partial spasms and paralyses, epileptiform convulsions, usually, or at all events at first, unilateral; fever, pulse frequent, or variable, temperature raised slightly at first, and raised more if suppuration come on. Vomiting. Delirium. Lastly coma, and death by exhaustion and compression. The relative prominence of the symptoms catalogued above, varies greatly in different cases. In comatose stage pupils eventually dilate. 2, Chronic. When it comes on long after receipt of injury, there may be premonitory signs, *e. g.* irritable temper, headaches, etc. The symptoms differ only from those of acute inflammation in being less concentrated and severe. *Diagnosis.*—Traumatic intra-cranial inflammation can scarcely be confounded with any other disease if its causes and signs are carefully considered. *Prognosis.*—Very serious, especially if not treated promptly and boldly. *Treatment.*—Cold locally, purging, calomel, venesection, leeching, morphia. Venesection rarely used now. Leeching over temples and mastoid processes very beneficial. But local cold is the most powerful remedy. The cold douche is the most effective form, and it should be used courageously and perseveringly. Icebags. Purging is highly praised. Calomel and butter placed on tongue. Small doses of calomel and morphia sometimes given, especially when furious delirium comes on a few days after a head-injury. Dark room, head raised on high hard pillows, hair cut short. For treatment when suppuration supervenes, see following paragraph. Probably many cerebral inflammations which have resulted from wounds would have been prevented by antiseptic dressings.

Intracranial Suppuration.—Within the skull, as elsewhere, suppuratio is one of the "terminations" of inflammation; it is practically very important whether the pus be between the skull and dura mater, just beneath the dura mater, or within the brain substance. *Signs.*—Not decisive. Symptoms of compression gradually coming on during encephalitis and accompanied by further rise of temperature, and rigors. At the same time a co-existent scalp wound may become pale and dry, or Pott's puffy swelling may form. If the wound be deep enough, the bone may perhaps be seen exposed by separation of pericranium. When these local signs are present, it is not unlikely that the pus is lying just beneath that part of the skull. *Prognosis* very bad; to make it worse, pyæmia is a not unfrequent complication. *Treatment.*—The main question is that of trephining. Difficulty of treatment consequent on difficulty of diagnosis. When above symptoms are well marked, trephining is clearly indicated. Then, if brain is not found pulsating beneath exposed dura mater, the membrane may be punctured. The knife has been plunged boldly into the brain itself, not without success. Operate antiseptically.

HERNIA CEREBRI.—*Causes.*—Wounds of skull and dura mater, followed by inflammation of part of brain immediately beneath it. More common in children, and when aperture in skull is small than when it is large. *Pathology.*—Inflammatory proliferation of connective tissue of brain, leading to a hernia of a substance whose structure is sometimes entirely like that of granulation-tissue, brain-substance and clotted-blood, and sometimes of blood-clot only. *Signs.*—Hernia usually appears a few days after injury, but may appear much later. Brown, or reddish-brown mass, pulsating synchronously with respiration, and increasing in size. Brain symptoms, sometimes very slight at first, are those of cerebral irritation and inflammation. In fatal cases death ensues from the encephalitis. *Prognosis* bad. *Diagnosis.*—From fungus of dura mater and fungus of cranium. Former appears gradually, and is preceded by no fracture from external violence. latter does not pulsate. *Treatment.*—Protective and slightly compressive. Shaving off is contraindicated. A hollow metal cap fitting accurately. An ordinary dressing, combined by a soft pad and bandage.

CONCUSSION AND COMPRESSION OF BRAIN.—"Concussion" and "Compression," two terms which represent each a peculiar and important assemblage of symptoms, rather than a definite pathological state. Persons suffering from concussion are, in common parlance, said to be stunned. Compression means a more alarming condition, in which the patient cannot be aroused from stupor, and lies wholly or partially paralyzed. The presence or absence of paralysis has been given as the distinguishing mark between the two states. Still there are cases which partake so much of the nature of both that no one would class them under either head, except persons endowed with exceptional decision of character and indifference to both detail and accuracy. The origin of the term should always be borne in mind: "Concussion," of course, means "shaking" or "striking," and "compression" implies the pressure of something, *e. g.*, blood, or pus, or bone, or serum, on the brain.

Concussion.—*Pathology.*—No thoroughly satisfactory evidence of concussions occurring without some bruising or laceration of the brain. *Symptoms.*—See table contrasting them with those of compression. *Terminations.*—Recovery may be and usually is perfect, or there remain headaches, mental irritability, affections of the senses, weakness, impaired virility, epilepsy. Concussion frequently passes into compression. See Contusion and Laceration of Brain. *Treatment.*—At first warmth, hot blankets, hot bottles, friction and other gentle remedies for shock. Alcohol, contraindicated. And it should always be borne in mind that concussion is not usually in itself dangerous, but that it is quite possible by too vigorous and too stimulating a treatment to bring on hæmorrhage or inflammation. When reaction has taken place, if not before, precautionary measures against hæmorrhage, inflammation, &c., should at once be adopted. See Precautionary Treatment of Fractures of Skull.

Compression.—Pathology.—Depressed fracture, of skull, extravasated blood within the cranium, inflammatory thickening or œdema of the brain, or pus within the cranium are found, besides in each case various conditions such as are sketched in the above notices of contusion, intracranial hæmorrhage, inflammation, &c. Symptoms of Concussion and Compression contrasted:

CONCUSSION.	COMPRESSION.
1. Insensibility, from which patient can usually be partly aroused.	1. Total insensibility.
2. Respiration feeble, like that of a person in a faint condition.	2. Respiration stertorous, slow, and puffing.
3. Pulse weak, irregular, and often frequent.	3. Pulse full, slow, labored.
4. Special senses dulled.	4. Special senses paralyzed.
5. Pupils variable, but usually sensitive to light.	5. Pupils widely dilated, or sometimes one dilated and the other normal or contracted.
6. Nausea as recovery is taking place.	6. Stomach insensitive.
7. Bowels relaxed, but sphincters not paralyzed.	7. Sphincters may be paralyzed, but bowels are torpid.
8. Bladder can expel water.	8. Bladder paralyzed; consequent retention of urine,
9. Comes on instantaneously and passes off gradually.	9. Does not usually appear at moment of injury, but afterwards, and tends to get worse.

Treatment of Compression varies with the suspected or known cause, whether extravasated blood, or depressed fracture, or inflammation, or suppuration, or foreign body. But always attend to these points: 1, dark room; 2. head high; 3, head shaved; 4, head cool; 5, low diet; 6, see that the bowels act freely, if necessary, placing a drop of croton oil in a little sugar on the tongue. The treatments of inflammation and suppuration are given above. The question of trephining for compression has been answered in the affirmative or the negative, according as the intracranial mischief is believed to be—local and accessible, or to be general. But I am inclined to hold that the introduction of the antiseptic treatment reopens this question, and that antiseptic trephining may be justifiable to relieve general intracranial tension.* I must again also call attention to the power of the cold douche long continued, *e. g.*, for hours, over intracranial inflammations.

Cerebral Irritation.—Pathology.—Probably laceration of brain. *Symptoms.*†—Graphically described in Erichsen—1, bodily; 2, mental. Bodily: attitude of general flexion—knees drawn up, elbows bent, &c.; restlessness; eyelids firmly closed; no heat of head; pulse weak and not frequent; rarely retention. Mental: irritable temper; desire to be let alone; muttering, frowning, grinding of teeth if disturbed. When these symptoms subside, the mind is left for a long time weak and fatuous. *Treatment.*—On general principles: rest, darkness, quiet, coolness, ice-bag, patience. Chloral and even morphia may be given in some cases; but their effects should be keenly and cautiously watched.

IV. INJURIES OF CRANIAL NERVES.—*Causes:* Fractures of bones of skull, extravasated blood, inflammatory effusion. *Signs.*—May be deduced from consideration of functions of these nerves. Paralysis in most cases, spasms in some. Disturbed nutrition of cornea and conjunctiva when fifth nerve is injured. *Prognosis*—Usually unfavorable; but when the paralysis or spasms come on during attacks of intracranial inflammation, recovery may take place on absorption of inflammatory effusion *Treatment.*—If possible remove the cause. Nerves most frequently affected are seventh and second pairs. To complete these notes on injuries of the head, we must notice traumatic osteitis of the cranial bones, which when acute is usually called "inflammation of the diploe." Chronic osteitis of cranium follows any injury (of course it is sometimes syphilitic); it may result in hypertrophy, caries, or necrosis. Acute inflammation of cranium is very dangerous, from its liability to spread to membranes of the brain.—C. B. Keetley.

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*See Yeo, Brit. Med. Journ, May 14, 1881.

†Not unlikely that the pecularity of this set of symptoms is due rather to the part in*jured than to the kind of injury.*

HEART, Fatty Degeneration of the.—*Natural History.*—A change in the muscular substance of the heart, which results in the elements of the muscular fibres being replaced by molecular fatty particles. The change tends to sudden death by rupture of the heart or by syncope. At least two varieties of fatty disease of the heart have been recognized:—(*a.*) In the one form the fat, composed of oil in nucleated cells—the ordinary fat-cells—grows on the surface of the organ, between its muscular fasciculi and the reflected pericardium, especially at the junction of the auricles and ventricles, in the groove or sulcus between the chambers along the trunk of the coronary veins, at the edges of the ventricles, at the apex and at the origin of the aorta and the pulmonary artery. The right ventricle is thus often almost entirely covered with fat, which so gradually encroaches on and insinuates itself between the muscular fibres, that it conceals, impoverishes, and ultimately causes them to waste from its pressure. The muscular walls become thin, especially towards the apex and over the walls of the right ventricle. In these parts the fibrous structure almost disappears, and the columnæ carneæ appear to spring altogether from the endo-pericardium. In this form of fatty heart the muscular fibres may remain healthy, although they sometimes eventually degenerate. It usually accompanies general corpulence, and especially the obesity of advancing age, where much alcoholic aliment is taken. (*b.*) In the other form of fatty heart a degeneration of the fibre ensues. Its muscular element disappears, and its place is taken by fat in a molecular form, so that minute oil-globules ultimately come to fill the sheaths which previously contained muscular fibre. It is a fatty metamorphosis of the primitive fasciculi of the muscular substance. The greatest number of cases occur between 50 and 80 years of age.

Treatment.—Iron in its various forms, quinine, and mineral acids are the medicinal agents suggested. Freedom from anxiety, thorough repose of mind, entire avoidance of fatigue, gentle and regular exercise in the open air, careful attention to the state of the skin, a generous and stimulating diet at regular intervals, in moderate and equable amount at each meal, are the main hygienic indications calculated to impart tone to the system, improve the condition of the blood, and so induce a more healthy nutrition of the heart. A salt-water sponge bath should be used daily. In cases where digestion is sufficient, cod-live oil, cream, and milk may be given with great advantage. The bowels should be so regulated as to render straining at stool unnecessary, as by quinine, aloes, and hyoscyamus in a pill at bed-time.—William Aitken.

HEART, Hypertrophy of.—*Natural History.*—The bulk of volume of the normal heart I have found to range from 12.5 cubic inches to 19.8 cubic inches and an hypertrophic heart may weigh from 16 to 32 ounces, from abnormal growth of its muscular substance increasing its volume by the thickening of the cardiac walls. The anatomical description of the condition known as hypertrophy is in reality a compromise between two opinions. By some it is regarded as a multiplication or increase in the number of the muscular fibres or primitive fasciculi—an hyperplasia. By others the condition is due to a thickening of existing fibres—an increase in bulk of the primitive muscular bundles—a true hypertrophy. Very rarely an idiopathic disease; for "spontaneous uncalled for hypertrophy" is less and less believed in—it is more commonly a secondary affection; and, in general terms, hypertrophy of the heart is always a compensating growth to overcome some obstacle. The hypertrophy may be general or partial—that is, may effect the whole heart or one side of the heart, or one ventricle or one auricle, or the ventricle of one side and the auricle of the other, or both ventricles or both auricles, or indeed every possible combination of the four cavities. The auricles, however, are much less frequently affected than the ventricles.

Two forms are recognized by the College of Physicians, namely:—(a.) Of the left side; (b.) of the right side.

In detecting enlargement of the heart and thickening of its walls, the size and force of the heart, ascertained by palpation, percussion, and auscultation, furnish the principal data. It is by the extent and power of the impulse that the heart's muscular condition is ascertained; and so long as the muscular condition is sound, the valve disease has but little influence on health. As a rule, however, the persistence of valve disease implies an enlarged heart, with an impulse increased in extent and in power. But there are cases where a murmur exists with a preternaturally strong, troublesome, quick, and smart impulse, but limited within a diminished cardiac region. Such a murmur is of anæmic origin, and the heart is usually lessened rather than enlarged.

The symptoms of hypertrophy of the heart are local and general. The local symptoms are—a powerful impulsion, a wider range of action, and some change in the sounds of the heart. There is also a greater extent of dulness of sound in the cardiac region, and sometimes a bulging out of the left side. The increased impulsion is in proportion to the greater thickening of the walls. In slight cases it is only sensible to the hand, while in others the heart "knocks against the ribs," which not only often causes a vibration of the præcordial region, but even shakes the whole of the chest. The abnormal action of the heart in these cases is often also visible, each contraction agitating the patient's dress, and sometimes even moving the bed-clothes. The point of the heart deviates more to the left, and its motions may be traced from the second or third rib as low as the sixth or seventh intercostal space. The increased thickness of the walls of the heart is unfavorable to the transmission of sound; and in simple hypertrophy without enlargement of the cavity, the natural sounds will be duller than in the normal state; and if the hypertrophy be attended with smaller cavities the normal sounds will be scarcely heard. When, however, the cavities are enlarged, the sounds are often clear, full, and even much louder than natural. In hypertrophy of the left ventricle the impulse is stronger immediately under the inferior portion of the sternum than between the fifth and sixth ribs. A sign of hypertrophy of the right ventricle is swelling of the jugular veins, which pulsate synchronously with the carotids. In general, this pulsation is limited to the inferior parts of the jugular veins, which pulsate synchronously with the carotids, but in other instances it has been seen to extend to the superficial veins of the arm.

Dilatation of the heart implies that the capacity of its cavities is increased disproportionately to the thickness of their walls; und practically the physician has principally to deal with the diagnosis and treatment of (1) Simple hypertrophy; (2) hypertrophy with dilatation of one or more of the cavities; and (3) simple dilatation with or without attenuation of the walls of the cavities. Inefficient power of the heart's action may ensue and become obvious by the following conditions: (1.) Palpitation; (2.) irregularity of rhythm; (3.) persistent intermittence, usually associated with an impaired first sound, defective apex-beat, and other signs of degeneration. Evidences of distress on the part of the heart are to be recognized—(1.) By cardiac engorgement; (2) palpation conveying a feeling of diffused impulse; (3.) percussion showing increased general dulness, frequently in the direction of the right side of the sternum; (4.) auscultation disclosing a short slapping sound, with or without irregularity, or, perhaps, evidence of laboriousness—a heavy swell with obvious effort, not followed by a corresponding effect—in filling the arterial vessels. A tickling cough, shortness of breath on exertion, slight attacks of bronchitis, pulse small and feeble, cardiac excitement, with irregular rhythm; such are the phenomena when dilatation predominates over hypertrophy. When hypertrophy of the left ventricle predominates over dilatation, there is visible pulsation of the carotids, a loud systolic sound in the larger arteries and a full pulse visible even in the smaller arteries; an abnormally strong heart-stroke, extending over the length of the heart; a depression of the apex, extension of cardiac dulness, intensification of the heart's sounds in the left ventricle and aorta, and sometimes a metallic click. When eccentric hypertrophy of the right side prevails, there is augmented heart-stroke, often extending along the sternum and left side of the liver; dislocation of the apex of the heart, which extends outwards rather than downwards; extension in width of the cardiac dulness, intensification of the cardiac sounds in the right ventricle and pulmonary artery.

Treatment.—The results of simple hypertrophy may, in the majority of cases, be greatly mitigated by such means as tend to tranquillize the action of the heart, such as occasional very moderate cuppings or leeching over the præcordial region. No known drug possesses the power of controlling the growth of the heart. Saline and aloetic purgatives aid the calmative influence of the local abstraction of blood. Diuretics are useful independently of the existence of dropsy. Sedatives of the heart's action are indicated throughout, such as aconite, hydrocyanic acid, acetate of lead, digitalis, and belladonna. Aconite is one of the best, in the form of the alcoholic extract, given in doses of one-eighth of a grain. In repeating the doses, the effects must be watched, while they relieve the painful sensations and disquietude about the heart. If anæmia prevails, animal food should be permitted; and the more soluble and less astringent preparations of iron should also be given. Fluids must be taken in small quantities; and alcoholic fluids of all kinds are to be entirely avoided. Months and even years of treatment may be required to produce any impression on the disease.

Like hypertrophy, dilatation of the heart is not removable by treatment, but judiciously-directed remedial measures may render the condition bearable, and even for a time unappreciated by the patient. To improve the tone of the muscle and strengthen the action of the heart, without exciting its irritability, are the objects to be aimed at in the management of the case. The influence of digitalis has recently been shown as a most efficient agent in helping to co-ordinate, by restoring the regularity of the heart's movements; and is only of use when hypertrophy exceeds the limits of compensation. It slows the pulse and regulates the heart-muscle, but if the heart-muscle is unsound it will not be of service. It is best given as an infusion, and continued as long as the quantity of urine increases or keeps up to the maximum which the digitalis produced. Potash or other diuretics may be conveniently added to vegetable infusious. Digitalis may also be given in pill, with the dried sulphate of iron, carminatives, laxatives, or both, twice a day. Half a grain of powdered digitalis, with on equal quantity of sulphate of iron, with a small portion (one-fourth of a grain) of Cayenne pepper, in extract of gentian, or aloes and myrrh pill, in a usefu form, which may be continued for months. This pill should be taken shortly after food. The addition of iron to digitalis is of great value and importance. The diet should be nourishing without being exciting; and may include animal food, with water only, or milk and limewater, for drink.

When dropsy appears diuretics yield most relief in the form of acetate, nitrate, iodide, and bitartrate of potas. Nitric ether, compound tincture of of iodine, the infusion and spirits of juniper, or gin, may all be employed in successive changes, and variously combined. Occasional small doses of blue pill and squill, at bedtime, will facilitate their action generally; and so will cupping over the region of the kidneys, if symptoms of congestion of these organs prevail. Hydragogue cathartics also aid the diuretics in subduing the dropsical effusions, in the form of elaterium, gamboge, bitartrate of potas. and the compound jalap powders in electuary, with syrup of ginger.—WM. AITKEN.

HEART, Injuries of—*See Injuries of Chest.*

HEART MURMURS.—The term "murmur" is applied to a sound superadded to the normal sound of the heart, which may occur with one or more of the natural sounds. These may be so obscured, or even obliterated, that the murmur or morbid sound is alone heard. According to their supposed seat of production these murmurs are.—(1.) Endocardiac, sometimes called valvular; (2) pericardiac, also called exocardiac. All endocardiac or valvular murmurs yield a "blowing," "rough," "rasping," "sawing," "booming," or "bellows" sound. as in the whispered expressions of the words "who" or "awe," the double letter "ss," or the single letter "r;" and there are certain spots where they may be heard in their greatest maximum force; namely,—(1.) A few lines above the left apex; (2.) just above the ensiform cartilage at mid sternum; (3.) on the level of the third interspace; and (4.) at the junction of the third left cartilage with the sternum. The physical causes which may explain the mechanism of these murmurs are due either—(1.) To pure natural orifices; (2,) to pure widenings of natural orifices; (3.) to pure roughness of surfaces; or (4.) to the association of the latter condition with either of the two former. When murmurs are due to such single or combined mechanism, they are said to be organic murmurs, to distinguish them from inorganic murmurs due to certain morbid causes not yet well understood. These inorganic murmurs are connected—(1.) With certain states of the blood, as in spanæmia; (2.) with dynamic or functional action of the heart itself. It is of the greatest importance to determine, therefore, the nature of a murmur, especially as to whether it is really organic or functional. In this investigation the essential points to be inquired into are as follows;—(1.) Observe the relationship of the murmur to the systole or diastole; that is, the rhythm of a murmur, or the position, in point of time, which it holds during the different physiological acts which constitute a complete cardiac pulsation—namely, the contraction, the dilatation, and the period of rest of each of the cavities; (2.) the spot of its maximum intensity on the surface of the chest; (3.) the direction in which the murmur is transmitted; (4.) its quality and pitch; (5.) state of the natural sounds of the heart which may remain; (6.) presence or absence of any audible phenomena in the arteries or veins, or both; and (lastly) the duration and clinical progress of the case. Each orifice of the heart may be the seat of two murmurs, constrictive and regurgitant, with or against the current; and thus eight murmurs are the total number the occurrence of which is possible. In determining the attributes of a cardiac murmur, the first step in the inquiry is to determine which is the second sound of the heart, and which is the first. In the rhythmical succession of the heart's actions the phenomena which we can appreciate externally are a little later than the commencement of the heart's action. Before there is either sound or impulse the contraction has already taken place; and whatever the pathological origin or seat of the murmur may be, those which immediately succeed the first sound and the impulse correspond to the period of ventricular contraction; and those which succeed the second sound correspond to the period of ventricular dilatation.

The murmurs of the heart to be distinguished are:

1. An auricular systolic murmur, which precedes and runs up the first sound of the heart, produced in all probability in one or other of the auriculo-ventricular orifices, inasmuch as it coincides with the forcible emptying of the auricles into the ventricles through these orifices. Its reasonable interpretation, therefore, is obstruction to the current of the blood entering a ventricle. If the left auriculo-ventricular orifice is affected, the murmur will be found to have the character of a mitral murmur; if the tricuspid orifice, its area will be triangular over that valve.

2. A ventricular systolic murmur succeeds and runs off from the first sound; it may be produced either in the auriculo-ventricular or in the arterial orifices. In either case, it coincides with the emptying of the ventricles; and, therefore, if auriculo-ventricular in origin, it is a murmur of regurgitation; if, on the other hand, it is of arterial origin, it is a murmur of obstruction. A ventricular systolic murmur may thus have four distinct solutions. If the area be mitral, it is a murmur of mitral regurgitation. If the area be aortic, it is a murmur of aortic obstruction. If the area be tricuspid, it is a murmur of tricuspid regurgitation. If the area is that of the origin of the pulmonary artery, it is a murmur which indicates pulmonic obstruction.

3. A ventricular diastolic murmur succeeds and runs off from the second sound, and may be produced either in the auriculo-ventricular, or in the arterial orifices. In either case it coincides with the filling of the ventricles; and, therefore, if auriculo-ventricular in origin, it is a murmur of obstruction; and if arterial, it is a murmur of regurgitation.

A ventricular diastolic murmur may thus have four distinct solutions among organic valvular diseases. If its area is mitral, it is a murmur of mitral obstruction; if its area is aortic, it is a murmur of aortic regurgitation; if its area is tricuspid, it is a murmur of tricuspid obstruction; if its area is of the origin of the pulmonary artery, the murmur denotes regurgitation from the pulmonary artery. The most frequent combinations of these murmurs are those which denote—1. Combined aortic obstruction with regurgitation, indicated by ventricular systolic and ventricular diastolic murmurs. 2. Mitral obstruction and regurgitation, indicated by auricular systolic murmurs, sometimes by ventricular diastolic and ventricular systolic murmurs. 3. Various combinations of the preceding forms, the aortic and mitral valves being both diseased. 4. Mitral obstruction with dilated right ventricle, and consequently tricuspid regurgitation, indicated by auricular systolic murmur, and ventricular systolic murmur. The rarest of all murmurs are those which denote obstruction of pulmonary artery and tricuspid obstruction. These murmurs are still more rarely observed singly, being usually in combination with diseases causing murmur on the left side of the heart.

An "accentuated cardiac second sound"—equivalent to an intensified or greatly pronounced sound—is heard in instances of aortic aneurism and aortic dilatation, associated with atheromatous degeneration, as well as in some cases of hypertrophy and dilatation of the left ventricle. In a case of aortic aneurism the second sound of the heart has been observed so intensified or accentuated over the base of the heart as at once to be recognized even by tyros in the art of auscultation. When this sound occurs, which is of a booming or ringing character, it is to be presumed that the aortic valves are competent. If they were insufficient, a diastolic murmur would be the result, as the prominent physical sign, and apt to cause the most skilful physician to overlook the existence of aneurism.

Areas of Murmurs.—Modern diagnosis localizes murmurs chiefly from the observation of the areas of transmitted sounds already indicated. There are four distinct areas to which murmurs arising at these orifices may be propagated. 1. Murmurs connected with the Mitral Valve, Orifice, or neighboring portion of the Left Ventricle, may be the result of inefficiency of the valve, by changes in its structure, or from roughness of its edges, as by vegetations, shortening of the chordæ tendiniæ, or fibrinous coagula amongst them, causing obstruction. It may also result from simple roughness or deposit on the under surface of the valve without positive insufficiency. It is a ventricular systolic murmur, of maximum force, heard at and immediately above, or to the outside of the left apex, and which may completely or partially cover the first sound of the heart at the left apex, but which may also preserve its natural characters towards the base. The pulse is generally small, weak, irregular, intermittent, and unequal, especially this systolic murmur is faintly or wholly inaudible at the right apex, the mid sternal base, the pulmonary and aortic cartilages. It is more or less clearly audible about and within the inferior angle of the left scapula, and beside the dorsal vertebræ from the sixth to the ninth. This murmur is rarely of high pitch; and once established it is permanent. To find the area of this murmur it is requisite to determine the exact seat of the apex beat, the patient lying a little to the left side, or even on the face. If there is no distinct apex beat, find the most remote point downwards and leftwards at which the impulse of the heart is discernible; test this point by percussion, to observe if it corresponds with the margin of the cardiac dulness; test it also by auscultation to hear if the first sound is conveyed thither with special distinctness. If a murmur concurs in position with the seat of these different phenomena, and if its seat of diffusion is round this point nearly in a circle, it is probably of mitral origin. 2. Murmur associated with the Tricuspid Valve may be due to regurgitation, or the sharp collision of blood among thickened and roughened chordæ tendinæ. It, too, is a ventricular systolic murmur, heard of maximum force immediately above or at the ensiform cartilage; inaudible, or nearly so, at the left apex, and very faintly, if at all perceptible, in the left vertebral groove opposite the lower angle of the scapula. It originates in the right ventricle; and when due to regurgitation, there is distension and pulsation of the auricle, vena cava, innominate and jugular veins, the distension of the latter being visible. It is generally a soft murmur, of low pitch, and rarely masks the systolic sound completely. It is a rare murmur, and often escapes detection from two causes, namely: a powerful mitral murmur, with which it is usually associated, or a deep-seated venous hum. The area of tricuspid valve murmurs is over the right ventricle, where it is uncovered by lung—i. e., at the lower part of the sternum, and over the whole space between this and the seat of the mitral murmur. It is usually but little audible above the level of the third rib, and is thus distinguished both from the pulmonic, and still more from the aortic murmur. In cases of considerable hypertrophy and dilatation of the right side of the heart, especially in connection with emphysema (when the ventricle pulsates in the epigastrium), the murmur is heard loudest towards the xyphoid cartilage, and along the margin of the seventh left costal cartilage. 3. Murmur connected with the Aortic Valve habitually signifies a rough constriction of that orifice, and in rare cases has been traced to fibrinous coagula impeding the egress of the blood. It likewise is a ventricular systolic murmur, heard of maximum force at mid sternum, opposite the third interspace, or upper part of the fourth rib. It abruptly loses force between this point and the left apex, where it may be almost inaudible. Faintly perceptible at the second left cartilage, it is clearly audible at the second right cartilage, the notch of the sternum, and the left vertebral groove, opposite the second, third, and fourth dorsal vertebræ, thence rapidly losing strength downwards. It originates at the aortic orifice, and disappears about the sixth dorsal vertebra. It is propagated into the arteries of the neck. It is a high-pitched, harsh, loud, and prolonged murmur. The concurrence of ventricular hypertrophy increases its intensity and prolongs its duration the more contracted the orifice is. The area of this murmur corresponds generally to the regions of the sternum, and is often absolutely loudest close to the xyphoid cartilage. 4. Murmur connected with the Orifice of the Pulmonary Artery may indicate obstruction or simple roughness in its valves, or pressure on the vessel by adventitious masses in the pericardium. It is a ventricular systolic murmur, heard of maximum force at the sternal edge of the third left cartilage, or a little lower down, and imperceptible in the back. It is rarely met with. 5. The Murmur indicative of Obstructive Narrowing of the Mitral Valve is a ventricular diastolic murmur heard in maximum force immediately above and about the left apex. 6. The Murmur which indicates the probability of Tricuspid Narrowing or Obstruction is also a ventricular diastolic murmur, and is heard in maximum force at the ensiform cartilage. 7. The murmur which indicates Regurgitation at the Aortic Orifice is likewise ventricular diastolic, and is heard of maximum force at mid sternum, opposite the third interspace or fourth cartilage; and is often carried down loudly to the left apex. It is usually of an inspired blowing character, sometimes almost hissing, rarely rough, and completely fills up the interval of repose and silence which ought to follow the second sound. It differs from the constrictive aortic murmur in being heard with almost as much intensity about the ensiform cartilage as opposite the third interspace. When it covers completely the second sound of the heart at the point of its maximum intensity, the valves may be presumed to be utterly incompetent. 8. The Diastolic Murmur connected with insufficient Pulmonary Valves is so rare that it is only mentioned here to complete the notice of cardiac murmurs which may be heard.

The relative frequency of intra-cardiac organic murmurs may be stated in the following order, commencing with the most common, namely: mitral regurgitant; aortic constrictive; aortic regurgitant; mitral constrictive; tricuspid regurgitant; pulmonary constrictive; pulmonary regurgitant; tricuspid constrictive; all of which may be variously associated together.

The point at which a murmur is produced being in the majority of cases one of the four valvular orifices, all doubtful murmurs should be tested in the first instance on the supposition that they are valvular. With this view the most important practical points to be determined are—(1.) The actual size and position of the heart, and the relation of its several parts to the thoracic walls; (2.) the anatomical præcordial space must especially be accurately defined; (3.) the exact point of the apex beat; 4.) the character of the impulse both of the right and left ventricle should be carefully studied; (5.) the exact seat and the limits of diffusion of the murmur actually under observation.

Pericardial Murmurs consist of friction or rubbing sounds, analogous to those already described in the pleura, and result from the movements of two opposed surfaces on each other, having been rendered dry or rough by change of tissue or exudation. Pericardial murmurs are also limited to cases of inflammation of the pericardium. These friction murmurs are generally double, and are sometimes louder during the diastole than the systole of the ventricles. They appear to be superficial or near, and are seldom audible beyond the limits of the præcordial region. They never replace the ordinary sounds of the heart, and are entirely independent of them. Their duration is usually short, frequently ceasing entirely after having been heard for a few days, and not unfrequently changing their character and seat within the period that they are audible. A peculiar vibratory thrill, sensible to the hand laid upon the parietes, frequently accompanies them.—WM. AITKEN.

HEART, Palpitation and Irregularity of the Action of the.—*Natural History.*—The irregularities are of the following kind: The heart may beat abnormally slow, may intermit, may have a rolling action, or its pulsations may be so frequent, and its action so irregular, as amounts to palpitation. The excessively slow pulse is often caused by some pressure made high up in the cervical portion of the spinal cord, or by congestion or pressure on the brain. The other states are as yet inexplicable, and may be considered as ultimate facts. The irregular and rolling action of the heart is in general accompanied with hypertrophy. Fits of palpitation, however, may occur in the most healthy subjects, and in the most healthy hearts, due to some abnormal innervation of the heart, by which its actions are rendered often highly irregular, and its pulsations remarkably increased in frequency. The excitability of the hearts of young people is readily accumulated and as readily exhausted. Every passion and every affection act powerfully on the heart's action, and change its healthy beat; also every error in diet, or any over-exertion, may produce the same effect. Every moral, as well as almost every physical cause, may consequently be the remote agent in producing palpitation, while every pathological state of the heart may be accompanied by it. As a primary disease, palpitation seldom occurs before puberty, but after that period it is common, and often to a most distressing degree in both sexes. The female suffers more than the male, and especially during amenorrhœa, or at the period of menstruation, and in more advanced life when menstruation ceases.

That palpitation is merely a disease of the function of the heart is evident from the number of young persons who suffer from it, and who afterwards attain a hale old age. Palpitation is, however, a common symptom of disease of the heart. Regarding palpitation as over-action of the heart, is apt to engender the belief that it indicates excess of power; on the contrary, the palpitating heart is more nearly allied to asthenia. It is evidently a laborious effort on the part of the heart, and indicates that it is overtaxed. It is generally intimately connected with more or less of ventricular engorgement; especially as a result of obstruction to circulation from diminution in the calibre of the arteries, as in Bright's disease, jaundice, and whenever poisoned blood is coursing through the vessels.

The attack of palpitation may be sudden, or only at night; or it may be preceded by acidity, flatulence, or other affection of the stomach. It has many degrees. In young persons of a delicate constitution it often occurs in a slight degree nightly; so that the patient, on going to bed, passes many hours sleeplessly, not only feeling his heart beat, but also hearing it. His subsequent sleep is unrefreshing, and he awakes in the morning more tired and jaded than when he went to bed.

Treatment.—During the paroxysm the patient should lie or be laid flat on his back, with his neck and chest bare, allowing the air to blow freely over him. The best medicinal restoratives are camphor mixture and ether ʒ i., with some mild opiate, as the syrup of poppies, ʒ i., or tinct. hyoscyami, mxx.; and this should be repeated everv quarter or every half hour or hour, according to the severity of the attack, till the heart's action is relieved. Cold brandy and water is an excellent substitute for, or adjuvant to, these remedies. If the attack occurs shortly after a meal, some purgative medicine may be necessary to clear the bowels. Leeches to the os uteri in females, and to the verge of the anus in males, sometimes relieves palpitation—proceeding in the one case from uterine congestion or hysteria, or from varicose veins and hepatic congestion in the male.

Digitalis is useful in some cases of irregularity of the heart's action; such as—(*a.*) Palpitation and acute depression from shock, marked by a small feeble pulse, coldness of skin, cold breath, diminished temperature, and evidences of the organic system of nerves being acutely depressed. In such a case the heart's walls contract ineffectively. (*b.*) The irregular action of cardiac asthenia. (*c.*) Of palpitation in dilated heart.

It is important to counsel the patient strictly as to diet for without such auxiliary assistance medicine is of little service in relieving palpitation. On questioning patients, it is constantly found that palpitation returns after tea or after breakfast, or whenever hot tea or hot coffee has been drank, and in these cases it is extremely desirable to wean the patient from all hot slops, and to induce him to drink cold water at his breakfast, and indeed at every meal. There are few tonics so beneficial as the natural tonic of cold water; and persons once accustomed to it feel a return to a modern breakfast as a punishment rather than a gratification.—WM. AITKEN.

HEART, Chronic Valve-Disease of.—*Natural History.*—The term "chronic valvular disease" is sometimes used in order to distinguish it from "chronic endocarditis." They are those lesions of the valves of the heart, or of its orifices, coming on for the most part insidiously, and which, persisting, induce obstruction or regurgitation, tending to hypertrophy and dilatation of the heart, with congestion of the pulmonary and systemic capillaries, œdema, anasarca, and dropsy. Valvular disease does not always owe its origin to endocarditis. It is often very insidiously established as a local expression of chronic Bright's disease, or chronic rheumatism, or gout, as well as in such forms of constitutional derangement of the system as are associated with imperfect nutrition of the body. The lesions to which valve disease may be referred are:—(a.) Vegetations; (b.) fibroid thickening; (c.) atheromatous and calcareous degeneration; (d.) aneurism; (e.) laceration; (f.) simple dilatation of orifice; (g.) malformations.

The exact lesion which causes the morbid state of the valves or orifices must generally, however, remain a matter of conjecture; and it is not of so much practical importance to determine the lesion, as it is to determine whether it is of such a nature as to cause obstruction to the flow of blood, or to permit of its regurgitation. One or other of these conditions is indicated by a persistent endocardial murmur, and the persistence of such murmur assuredly points to a condition which must lead to cardiac hypertrophy and dilatation. Nevertheless, disease at the various orifices operates very differently, the one from the other, in many particulars.

Aortic obstruction, one of the most common forms of valvular disease, has little effect in producing engorgement of the pulmonary capillaries, or general systemic congestion and dropsy; except when it induces dilatation of the left ventricle, and so causes the mitral valve to become so inefficient as to permit of regurgitation.

Mitral obstruction, although less common than mitral regurgitation is recognized much more frequently than formerly. It necessarily induces dilatation of the left auricle; and, therefore, hypertrophy of this cavity and of the right ventricle more especially are the means of compensation, which, although it may defer for a long time systemic serous engorgement, cannot prevent a certain amount of pulmonary congestion. Hence severe cough, dyspnœa, attacks of cardiac asthma, and severe palpitations are common. Congestion, œdema of the lungs, and not unfrequently pulmonary apoplexy, are the ordinary modes of death. The pathognomonic indication of contraction of the mitral orifice is a "presystolic" or "auricular systolic" murmur, having the following characters:—Its place in the cardiac rhythm is "presystolic." It is loudest over the apex of the heart and confined to the region of the apex. It is inaudible or scarcely audible at the base, and is very rarely carried round the axilla to the back. If the stethoscope be placed over the third left costal cartilage the natural cardiac sounds are perceived unless there be co-existing aortic disease. The "presystolic bruit" has a rough, churning, or "grinding" character, and is frequently accompanied by a markedly palpable thrill.

Aortic regurgitation, from incompetency of the sigmoid valves, one of the most common forms of chronic valvular disease, finds compensation in hypertrophy and dilatation of the left ventricle. The lesion is accompanied by a peculiar and very characteristic pulse-beat. The prolonged swell imparted to the blood at each systole is not sustained by the perfect closure of the valves. The waves of blood are short and abrupt; the pulse jerks and leaps, giving a sensation as if successive balls of blood were being shot suddenly under the finger—peculiarities which are consequences of the low arterial tension, caused by the regurgitation of blood into the ventricle during its diastole.

Mitral regurgitation is the most common of all forms of chronic valvular disease, and depends for compensation mainly on hypertrophy of the right ventricle. Hypertrophy of the left ventricle and dilatation of the left auricle also occur, leading to systolic auricular impulse at the second intercostal space, by admitting of the transmission of the impulse from the ventricle. When excessive, it causes a vibration, a thrill, or a purring tremor, perceptible on the chest-wall in the region of the heart, but which is not transmitted to any extent along the aorta or great vessels. When the regurgitation is combined with contraction of the auriculo-ventricular orifice, the left auricle usually becomes hypertrophied as well as dilated; and this additional lesion always diminishes the irregularity of the pulse characteristic of pure mitral regurgitation. Mitral regurgitation primarily interferes with the circulation through the lungs, producing cough, dyspnœa, and other symptoms of pulmonary congestion and pulmonary apoplexy is common. The pulse is characteristic. It is irregular in rhythm, and unequal in force and fullness, resembling the undulating pulse of typhus fever.

Regurgitation through the tricuspid orifice, although rare as a primary disease, yet is not uncommon as a consequence of dilatation of the right ventricle, which then becomes hypertrophied, the right auricle dilated, the *venæ cavæ* distended, and there is a strong tendency to congestion of the systemic and cerebral capillary circulation.

The symptoms thus produced by valvular disease mainly depend on the impediment offered to the pulmonic and systemic capillary circulation. In the more advanced stages all forms of valvular mischief result in a certain amount of capillary engorgement; and therefore all forms of valvular disease have many symptoms in common. Oppression at the chest, breathlessness, speedy exhaustion on exertion, a general sense of lassitude, headache, restless and disturbed sleep, with frequent starting and frightful dreams, cough, palpitation, dropsy, occasional pain in the region of the heart, and sometimes severe angina, are amongst the earlier phenomena. Cough is due to pulmonary engorgement, and varies with the amount of mitral obstruction or regurgitation. Dyspnœa, while it is an early and constant symptom of mitral lesions, is, on the other hand, frequently absent in affections of the aortic valves until the latter stages. On the other hand, headache, restlessness, disturbed sleep, and dropsy, are proportioned to the amount of systemic capillary congestion, and vary with the extent of *tricuspid obstruction or regurgitation.* Albuminuria is not an uncommon occurrence in the latter stages. It is generally preceded by scanty urine, of a high color, high specific gravity, and loaded with urates. The dyspnœa of cardiac disease is peculiar and characteristic. The dropsy of cardiac disease makes its appearance late as œdema or anasarca, very partial and slight at first—a puffiness merely of the eyelids, or more frequently slight œdema of the ankles. By slow degrees it ascends towards the trunk, and ultimately involves the upper extremities and the face, the scrotum in men and the labia in females becoming enormously swollen. Towards the close, effusion is apt to occur into one or both pleuræ, but ascites is not common. The first appearance of the dropsy indicates that a new law takes effect in the circulation, and gains the mastery over the law of health, which has hitherto been able to retain the watery elements of the blood within the blood-vessels. Now the serum escapes from the blood-vessels, and accumulates in the areolar tissue of the body. The forms of valvular disease, in the order of the frequency in which dropsy is met with, are—(1.) Considerable contraction of the left auriculo-ventricular orifice; (2.) dilalation of the right auriculo-ventricular orifice, with hypertrophy and dilatation of the right ventricle; (3.) a state of the mitral valve and orifice permitting free regurgitation; (4.) considerable contraction of the aortic orifice. As a general rule dropsy supervenes earlier, the earlier general venous congestion ensues. A varicose condition of the blood-vessels on the air vesicles of the lungs is very soon established, which essentially aggravates the dyspnœa.

Treatment.—All the bad symptoms in valvular affections arise from defective compensation; and as the compensation in all cases depends on the integrity of the heart-muscle, the maintenance of its nutrition is the first great indication. In affections of the aortic valves, when the heart-muscle is well nourished, an almost perfect compensation may be maintained for years by a nutritious diet, with fluids in small quantity and tonics, especially preparations of iron. In the earlier stages a moderate and steady amount of exercise is beneficial. In mitral affections, on the other hand, the compensation can never be so complete as to do away with the tendency to pulmonary complications. In these cases, therefore, while the same nutritious diet and tonics are indicated to promote the nutrition of the cardiac muscle, exercise must be taken more cautiously; the object being to regulate and moderate the action of the heart, controlling the tendency to local congestion, and mitigating or removing the symptoms which result from the cardiac derangement. If the patient be plethoric, the heart's action tumultuous, and its impulse forcible, cupping between the shoulders may afford immediate relief to palpitation and oppression at the chest; but repeated or profuse venesection is calculated to excite irritability of the heart, to impoverish the blood, and to induce dropsy. Repetitions of blood-letting ought, therefore, to be effected by the application of leeches to the præcordial region, aided by dry cupping, mustard poultices, and turpentine fomentation. When, however, active congestion of the lungs exists, venesection, cupping, blisters, and sinapisms are required. When the heart's action is tumultuous and irregular, one of our most powerful remedies in mitral affections is digitalis. It slows the pulse and increases its tension, while strengthening the heart's action. When the aortic valves are incompetent, digitalis does harm by augmenting regurgitation. It should not be given when there is any evidence of fatty degeneration of the cardiac muscle. The best test of its beneficial action is the quantity of the urine. As long as the flow increases or keeps up to a maximum, which the digitalis has produced, the drug is acting beneficially. Sleeplessness being one of the most distressing symptoms, opium in some form might be considered advantageous; "to give sedatives in such a case would be the refinement of cruelty" and dangerous to life. Careful regulation of the patient's mode of life is above all things necessary in chronic valvular disease. Excitement of all kinds must be avoided; and the diet should be light, nutritious, and of moderate quantity; the clothing warm, and cold should be carefully avoided, especially by those affected with mitral disease. When anasarca supervenes, the hydragogue cathartics are required to ensure copious watery discharges from the bowels. Electuary of bitartrate of potash and compound jalap powder in syrup of ginger, or gamboge, elaterium, podophyllin should be given on alternate days. Alcoholic stimulants also may be required, the most suitable being Holland gin or whiskey.—WM AITKEN.

HECTIC FEVER.—The fever which results from and accompanies chronic diseases of an exhausting character.

Causes.—Any chronic suppurative disease, especially abscesses connected with bone-disease which have opened externally. Empyemata, chronic suppuration of mucous tracts; compound fractures, or diseased joints, etc.,

Pathology.—Probably owing to the absorption into the blood of the products of inflammation or disintegration.

Symptoms.—Remittent or intermittent daily. Temperature rises towards afternoon or evening; red circumscribed flush on cheeks; tongue dry; skin dry and hot; eyes bright; slight excitement and sleeplessness. This stage is followed nightly by profuse sweats; towards morning patient falls asleep; on awaking he is still bathed in perspiration; but with the fever and high temperature either wholly or comparatively passed away. In the afternoon the same round of symptoms recommences. In the latter stages of hectic, the "colliquative" sweats, as they are called, get more and more profuse and exhausting, and the fever often recurs twice a day; the mouth becomes aphthous and the legs œdematous. Mental state usually clear throughout; range of temperature generally between 99° and 102°; diarrhœa is common.

Prognosis.—Depends on the cause.

Treatment.—If possible, remove cause, *e.g.*, chisel out carious bone; make large abscess aseptic; give abundant nourishment; do not overpower the digestion; quinine in 5-grain doses; sulphuric acid, iron, opium, strychnine, astringents; give opium cautiously; its use is to relieve any coincident pain. Elevate the œdematous legs; flannel bandages carefully applied to these limbs; astringents for the diarrhœa.

INFLAMMATORY (or SURGICAL) FEVER.—The fever which usually accompanies inflammations and injuries. No line can be marked out as separating this fever from septicæmia; the two condition, pass imperceptibly into one another; in applying either name to a given case, one considers whether the symptoms and facts point to the raised temperature, or to an absorption of septic material as being the chief direct cause of the phenomena which the case presents. *Causes and Pathology.*—1, The blood being simply heated by passing through an inflamed and consequently heated part; 2, the blood being poisoned by absorption of some product of inflammation, whether decomposed or not. All the symptoms of inflammatory fever and of its ally, septicæmia, can be produced by injection of pus, 2, putrid liquids, SH_2, etc., into the blood or cellular tissue of animals. *Symptoms.*—Ususually within forty-eight hous, almost always within seven days of an injury, the following symptoms may appear: increase of heat, subjective, and evident also to the thermometer, frequent pulse, chilliness or rigors, furred tongue, sleeplessness, excitement, even slight delirium; urine high-colored, deposits urates; bowels confined. The fever usually lasts a week. Persistence beyond a week denotes some complication, *e.g.*, abscess or erysipelas. If a complication cause the symptoms to recur after once disappearing, we have "secondary fever." *Prognosis.*—No danger from traumautic fever itself, provided complications do not happen. In children, latent tuberculosis readily awakened by surgical fever. Paget. *Treatment.*—See the treatment of wounds and the prophylaxis of septicæmia. Saline, refreshing drinks, fresh air, quiet rest, etc.—C. B. KEETLEY.

HEMERALOPIA.—A disease, in which the eyes enjoy the faculty of seeing while the sun is above the horizon, but are incapable of seeing by the aid of artificial light. Its causes are not evident. The eye, when carefully examined, presents no alteration, either in its membranes or humors.—DUNGLISON.

HEMICRANIA—*See Neuralgia.*

HEMIPLEGIA.—A form of paralysis affecting one lateral half of the body—unilateral paralysis. It is that form of palsy to which the name of "paralytic stroke" is commonly applied, and indicates organic lesion in that cerebral hemisphere opposite the side which is paralyzed. Either lateral half of the body may be affected; and the parts which are actually involved are generally an upper and lower extremity, the muscles of mastication, and the muscles of the tongue on one side. The paralysis may be either complete or incomplete as regards motor power. Consciousness may or may not be perfectly retained; and whether it is so or not, the patient, when seized, falls to the ground, because the power of maintaining his equilibrium is destroyed by the failure of the antagonizing muscles of one-half of the body. The affected arm and leg lie as if lifeless by the side, all power of motion in them being destroyed, the leg resting on its outer aspect, with the toes everted. Stimulation, however, of the extremities of the sentient nerves, by slight titillation with the fingers, sometimes gives rise to active movements, which cause considerable pain. These excited motions, to which the name of "reflex actions" has been given, occur almost exclusively in the lower extremities. Other involuntary movements of the paralyzed limbs occur simultaneously with the action of yawning, or result from emotions of surprise, joy, pleasure, grief, laughter, crying. If the hemiplegia is not so severe as to prevent walking, the attitude and gait are characteristic. The patient leans to the sound side, and generally carries the helpless arm supported in the opposite hand; the leg in walking is swung outwards by a sweep of the whole limb from the hip-joint, the toes drooping downwards as the foot leaves the ground. When the fifth nerve is implicated in the hemiplegia, the proper masticatory movements are unequal on the two sides, in consequence of paralysis of the temporal, masseter, and pterygoid of the affected side. There is a want of force in the masseter muscles of the paralyzed side; and there is therefore apt to be lateral displacement or obliquity of the inferior maxilla, either when at rest or during mastication. The mesial line between the lower incisors is thus also apt not to correspond to that in the upper jaw.

Sometimes the third nerve may be paralyzed, in which case the upper eyelid drops, and there is inability to raise it, combined with outward squint and dilated pupil.

The protrusion of the tongue is also characteristic in hemiplegia. It is pushed out towards the side affected, and on being retracted it is drawn towards the healthy side. Imperfect articulation exists, and results from the palsy of the ninth and fifth nerve; and where the power of speech is wholly lost (most usually in paralysis of the right side) or utterance is limited to monosyllables, the sign is not favorable, but denotes, with other symptoms, extensive lesion of the (left) brain, superficial as well as deep. When deglutition is impaired, serious and extensive lesion of the brain, connected with the vagus or glosso-pharyngeal nerve, is denoted.

In all forms of hemiplegia the paralysis is a paralysis of motion more or less complete. In general, however, sensation is also more or less impaired. In estimating the condition of the sentient functions, the same method is to be adopted which Weber devised in comparing the sensibility of the surface of the skin in different parts of the body. It consists in ascertaining how near the sharp points of a pair of compasses may be approximated, and yet be distinctly felt as two points by the patient.

Treatment.—The object to be aimed at in the early treatment of hemiplegia is to keep down the frequency and force of the heart's action. For this purpose strict maintenance of the horizontal position is necessary; and when consciousness exists, let the mind be kept tranquil by every means. Remove any local impediment to the easy flow of blood, and let the head be slightly raised, sufficient to prevent gravitation favoring the escape of blood from the ruptured vessels, but not so as to create any impediment to the flow, and so embarrass the action of the heart. Let the bowels be cleared out, so that no irritation from them may operate injuriously on the brain. In so doing, enemata ought to be employed; and failing these, castor oil or calomel, with compound jalap powder, may effect an efficient evacuation.

With regard to blood-letting, there are three objects to be attained,—(1.) To diminish an undue amount of blood to the head; (2.) to check hæmorrhage, or to prevent it; and (3.) to quiet the action of the heart. The circumstances under which its use is inadmissible are the following:—If the patient be cold and collapsed; if the heart's action be feeble and intermittent; if there be an anæmic state; if the patient be of advanced age; if there is evidence of extensive disease of the arterial system or of the heart; or, lastly, if it can be ascertained that already a large amount of hæmorrhage has taken place into the brain;—these, singly or conjointly, are reasons why bleeding ought not to be resorted to. If none of these objections exist, it is to be considered whether any of the three indications noticed require to be fulfilled, and whether they can be best fulfilled by local or general blood-letting. Rigidity of the muscles, coming on very early, indicates an inflammatory process going on round the clot, and is to be combated by urinary and alvine evacuants, and by counter-irritation. It is not desirable to interfere in the later forms of muscular rigidity. Time is an important element in the cure. With regard to the use of expedients for promoting the restoration of the paralyzed limbs to their normal conditions, nothing is of more decided benefit than a regulated system of exercise—active when the patient is capable of it, passive when he is not—by systematic motion of joints. A hot or cold douche may also be useful. The applications should be continued two or three minutes, and continued daily for some time. Friction with flesh-brushes, gloves, or the hand merely, should also be persevered with daily.

To prevent atrophy of paralyzed limbs, to improve their nutrition, and stimulate feeble circulation, the application of Faradization and the interrupted galvanic currents are recommended. The current should never be so strong as to cause pain. It will not further improve motion beyond restoring muscles to a condition of normal contractility. When œdema of the limbs exists, a warm bath to the part every night is of service. The bowels must be kept open; and if anodynes are required, opium should be avoided, and hyoscyamus, conium, Indian hemp, or croton chloral should be used instead.—WM. AITKEN.

HEPATITIS.—*Natural History.*—In all countries in the temperate zone, at least two forms of inflammation of the liver occur. One terminates in simple or granular induration, and has a clinical history of its own; the other, in a greater or less extent of softening and acute atrophy of the gland, with jaundice and febrile phenomena of a malignant typhoid type (acute yellow atrophy). In tropical climates a third form has a tendency to result in suppuration, and is described under the name of suppurative hepatitis. The inflammation may have its seat in the fibrous envelope of the gland (peri-hepatitis); or in the sheath of the vessels in Glisson's capsule; or chiefly the glandular parenchyma, the portal or hepatic veins, or the bile-ducts.

Inflammation of the capsule of the liver (peri-hepatitis) and of Glisson's capsule is rarely accompanied by serious derangements, unless the inflammation extends to the portal or hepatic veins, or causes obstruction of the larger bile-ducts. It may exist alone in some cases of syphilitic infection; but it is most frequently associated with interstitial hepatitis. Peritonitis, disease of the liver itself, or inflammation of neighboring structures, such as pleurisy, are the usual causes of peri-hepatitis. The chief symptoms are, tenderness over the hepatic region on pressure, motion, or deep inspiration, without any change in the volume or situation of the organ. Jaundice, as a rule, is absent; so also are febrile phenomena.

Inflammation of the glandular or hepatic parenchyma occurs either as a circumscribed process limited to isolated patches, which leads in most cases to suppuration and the formation of abscesses, or it is diffuse, extending over the entire organ in a more or less unform manner, inducing rapid destruction of the gland elements, with softening and atrophy of the organ; or it induces induration and scirrhotic degeneration.

Treatment.—Tartar emetic in one-eighth or one-fourth grain doses every two or three hours, is of service in the acute inflammations, if given sufficiently early—*i. e.*, within the first three days, when there is much vascular excitement, and a full, bounding, unyielding pulse, with a dry hot skin and scanty urine. General bloodletting may be adopted if there be evidence of obstruction to venous blood-flow through the right side of the heart; but usually local depletion by leeches over the region of the liver, and also round the anus, so as more directly to unload the portal system, must be at once resorted to, and will generally be sufficient, followed by fomentations and large linseed meal poultices, made as light and soft as possible, over the hepatic region. Mustard may be added to them, or laudanum may be sprinkled over their surface. Saline purgatives and alkalies, with or without colchicum, are also to be freely administered. Hot turpentine epithems are very beneficial. Iodide of potassium, in combination with taraxacum, is of great service in the chronic forms. Alcoholic stimulants and fermented drinks must be absolutely forbidden, and the diet restricted to mild nutriment, such as milk, beef-tea, and farinaceous food generally.—WM. AITKEN.

HERNIA.—This word, which probably is derived from Greek *ernos*, a shoot, is applied to the projection of viscus through the wall of any of the body-cavities, *e. g.*, hernia cerebri, hernia of lung; and, by extension, it is given even to such phenomena as bulging of tunica intima of an artery through an opening in the media and adventitia. But "hernia" used without qualification refers only to hernia abdominalis.

Causes.—Predisposing: 1, Sex, four times as often in males as in females. 2, Age, most hernias develop before age of 35. 3, Occupation, habit of making violent efforts. 4, Hereditary conformation, including patent tunica vaginalis funiculi, abnormal laxity of mesentery, congenital defects of abdominal walls. 5, General weakness of the system. 6, Excessive obesity and flabbiness. 7, Pregnancy. 8, Defects in abdominal wall of traumatic origin, cicatrices, etc. Observe that number 4 includes 3 causes. Cause 6 acts strongly if obesity rapidly diminishes.

Exciting Causes.—Sometimes a strain or violent efforts often repeated.

Cough. In male infants, the application of a truss to an umbilical hernia may result in the production of an inguinal hernia.

Symptoms.—In earliest stage, merely "weakness" locally, with slight fulness in erect position and impulse on coughing. Then a soft, round or oblong tumor develops, reducible generally with a gurgling noise. If containing omentum it is called "Epiplocele," and may be hard and lobulated. Herniæ are opaque, and dull on gentle percussion. Mode of appearance and growth, usually sudden in "congenital" hernia, gradual in other forms. A hernia passes by a broad neck into the abdomen. Subjective signs are dragging pains and dyspeptic feelings. Herniæ are often irreducible.

Anatomy.—A hernia consists of (1) contents, (2) sac, (3) coverings. Contents: intestine, omentum, or, more rarely, one of the other abdominal or pelvic viscera, *e. g.*, ovary, stomach, gall-bladder. Fluid between sac and contents, variable in quantity. An "enterocele" contains bowel only, an "epiplocele" omentum only, an "entero-epiplocele" both. Sac: is continuous with peritoneum. It is identical with tunica vaginalis in "congenital" hernia; but, in other cases, is formed by gradual pushing out of a pouch of peritoneum. It consists of a mouth, neck, body, and fundus. Mouth and neck are originally puckered; but, with time this puckering obliterates, and, still later, the neck and mouth are apt to thicken and contract. Hence many cases of strangulation. If a hernia be reduced before its sac has had time to grow old, thickened, and adherent, the sac will be drawn up into the general peritoneal lining of the abdomen again.

Diagnosis.—See special varieties of hernia, especially inguinal and femoral.

Prognosis.—It spite of the regular use of trusses, hernia usually persists throughout life. Fair prospect of recovery in umbilical hernia of male infants, and in slight inguinal herniæ promptly, patiently, and persistently treated. Congenital herniæ are most liable to strangulation, irreducible herniæ to obstruction. Umbilical herniæ of women may attain enormous size, especially in fat flabby women. So also may other herniæ, if neglected.

Treatment.—Palliative, that is the truss. Common truss, single or double, inguinal or femoral; Salmon and Ody's; moc-main; various pads, Wood's horse-shoe pad, circular pyriform and oval pads, water-pads, air-pads. Bag-trusses for irreducible hernia. Spring of common truss encircles pelvis just below crest and anterior superior spines of ilium. Salmon and Ody's has a ball-and-socket joint, with a spring going half round body on side opposite to rupture. Moc-main has a soft belt with a lever spring near the pad. Wood directs pad to be flat, saying that rounded pads tend to dilate hernial apertures. For umbilical hernia, pads with belts, corks, strapping, &c. See Umbilical Hernia.

Points to be noted in fitting a truss:—1, Side of hernia (right or left); 2, size of projection; 3, size of hernial aperture; 4, kind of hernia (inguinal or femoral). Measurements: 1, girth of body midway between great trochanter and anterior superior spine of ilium; 2, distance between anterior superior spine and hernial aperture; 3, direction in which pressure should be made. In fat, large-bellied people this is usually upwards and backwards, in thin people it may be simply backwards. The pressure of the spring should be adjusted carefully. Infants should have two trusses; the one may be worn while the other is being cleaned. Moc-main truss probably most comfortable, but has very little strength. Persons who have to make great efforts occasionally should have an extra strong truss for such times.

Radical cure of hernia, operative treatment.—See Wood on Rupture, or some large treatise on surgery. The operation is done only for inguinal hernia.

Complications of hernia, three primary ones, viz.: 1, Obstruction; 2, strangulation; 3, inflammation. Gangrene and ulceration are secondary to one of these primary complications.

Obstructed Hernia.—In this condition the impediment to the transit of fæces lies within the bowel, not external to it as in strangulation. But the symptoms differ from those of strangulation chiefly in degree. When obstruction is complicated with inflammation, diagnosis from strangulation is very difficult. Umbilical herniæ are the favorite seats of obstruction. Pain, flatulence of tumor; increased tension and size of tumor; on manipulation, gurgling may be produced and solid fæcal matter felt. Feverishness, nausea, vomiting. *Treatment.*—Poultices and aperient enemata. Gentle purgations before vomiting occurs.

When an irreducible hernia is obstructed, it is sometimes called an "incarcerated hernia."

Strangulated Hernia.—The herniated parts are so compressed at or near neck of sac that the circulation of blood through their vessels and of fæcal matter through herninated intestine is obstructed. *Predisposing causes.*—Disordered or relaxed state of health. Sudden formation and descent of a congenital hernia. Working without having the prudence to keep up a hernia by a truss. *Symptoms.*—Local: pain, tenderness, swelling, usually increased tension, uneasy feeling in hypogastrium, dragging sensations from neighborhood of rupture. General: nausea, anorexia, vomiting, constipation, tenesmus, feverishness, flushed cheeks, frequent pulse, furred tongue. Then vomiting gets worse, local tenderness increases, peritonitis comes on, patient collapses and dies. The vomiting is rarely absent. It is of a characteristic nature. Large quantities of fluid are thrown out of the mouth with a sudden gush. This fluid at first comes from stomach, then intestines; it is then called "fæcal," sometimes stercoraceous." Constipation is complete. *Pathology.*—Constriction of hernial tumor at point of strangulation, so that when the bowel is liberated a distinct groove still remains, marking the line of stricture. Changes which take place in strangulated bowel or omentum are, 1, congestion and swelling; 2, inflammation; 3, gangrene. The signs of these three stages will be given in describing the operation of herniotomy; as it is most important to bear them in mind during that operation. The fluid in the sac will be described at the same time. *Diagnosis.*—Generally easy. But, if the general symptoms of intestinal obstruction coexist with any tumor in one of the recognized seats of hernia, unless that tumor is known positively not to be a hernia, and unless the case is yielding to other treatment, the surgeon should cut down upon the tumor. Very little harm can result from the procedure. Strangulation is sometimes difficult to distinguish from mere obstrnction with inflammation. In the latter case there is less vomiting; always great local tenderness, and, instead of absolute constipation, the occasional passage of flatus and liquid. It is to be borne in mind that peritonitis may complicate without being caused by a hernia. *Treatment.*—1, Taxis, 2, warm bath, 3, opium, 4, rest in warm bed, 5, anæsthesia, 6, herniotomy. Although numbers 2, 3 and 4 are usually described as auxiliary to the taxis, I put them separately for two reasons, viz.: 1, that they are in a few cases perfectly competent to reduce the hernia without the assistance of the taxis; 2, that they are much underrated nowadays in consequence of the reaction against that sad mistake which has allowed so many cases to pass beyond hope before operation, and in consequence of the notion that these minor remedies act only by relaxing the constricting bands; whereas they may act directly on the stranulated parts themselves by reducing the congestion and consequently the size of the strangulated intestine. Some amount of circulation must usually exist during the first stages of strangulation, or the intestine would not live as long as it does. In every case, firstly, make a short and gentle application of the taxis. Secondly, give 20 minims of laudanum, then a warm bath for a time proportional to patient's strength, and then place him in bed between blankets.

Still keeping the patient warm in blankets, anæsthetize him, and try the taxis gently again. If it fail this time, operate at once. The taxis. Position of patient, supine with his legs drawn up. Bear in mind resisting forces, viz: 1, tightness of constricting ring or band; 2, swelling of strangulated viscus. Manipulate hernia as nearly as possible into a line with the axis of the ring which constricts it. Then compress it gently but steadily and completely with the hands or with the fingers for a long time. This may lessen the bulk. By-and-by, still keeping up this compression with one hand, attempt with the fingers and thumb of the other to manipulate the neck of the hernial tumor back into the abdomen. It is said that in very thin persons assistance may be derived from insinuating the finger end or nail beneath one edge of the constricting ring and pulling it outwards. When reduction takes place, bowel goes back suddenly with a gurgle. Warm bath, average time twenty minutes. Laudanum, dose twenty minims. Anæsthesia not only makes patient insensible to pain of proceedings, but destroys any muscular resistance that he might otherwise make. Practice of inverting patient during performance of taxis. Aspiration of hernial tumor before taxis.

HERNIOTOMY.—Usually classed as 1, herniotomy without opening sac; 2, herniotomy with opening sac. Both operations identical up to a certain point. Scalpel, forceps, director, artery forceps, ligatures, retractors, hernia director, hernia knife; strong ligature to tie omentum. Empty bladder, shave, line of incision 2 to 3 inches long over neck of sac. Observe the position of certain anatomical land-marks, *e. g.* spine of pubes, Poupart's ligament, femoral artery. Skin may be divided by pinching up and transfixing. Divide fascia, fat, and cellular tissue on director, layer by layer down to sac. Before opening sac feel for any constricting bands external to sac and divide them if possible. If strangulation cannot be relieved thus, proceed to open sac by pinching up a small part of it with forceps and cutting it with knife held flatwise. Complete opening of sac on a director. How to distinguish sac from intestine:—The sac is a transparent membrane without the special marks possessed by intestine, such as arborescent arrangement of vessels, smooth, glittering surface, &c. It is also thinner than intestine. The opening of the sac is almost always recognized by the sudden escape of fluid. Division of stricture:—Use left index finger as a director, insinuate finger-nail under stricture, pass hernia knife flat, along palmar surface of finger, through stricture, then turn its edge upwards and slightly inwards and cut ⅛th to ¼th of an inch, *i. e.* a mere notch, no more. Reduction of the hernia is then effected by manipulation like that of the taxis. If necessary the knife must be re-introduced and the constricting band notched again. But there are certain conditions under which it is not right to reduce the hernia after dividing the stricture. It follows, of course, that when indications of these conditions are present no attempt should be made to reduce a hernia without opening the sac to see the actual state of things. Gangrenous bowel, bowel manifestly ulcerated at the seat of the stricture, and omentum inflamed or bruised should not be returned into the abdomen. In the former two cases an artificial anus will form. In the case of inflamed omentum its return would probably set up general peritonitis; therefore the practice is to tie *a stout ligature round* its neck and cut the omentum off, merely leaving *the neck or stump of it to block* up the hernial ring. Slight wounds of the bowel do not contra-indicate its reduction. The sides of a puncture can be pinched up and ligatured. A larger wound would require the glover's suture. *Characters of the serum in the sac.*—1, Within a few hours it is pale, yellow and clear. 2. After many hours it becomes dark brown, but clear. 3. When intestine is more inflamed, œdematous and leathery, the fluid is turbid and coffee-like. 4. As gangrene approaches, blood-clots, lymph-flakes and pus mix with the fluid. 5. When intestine gives way, fæces and gas escape. *Characters of the intestines at different stages of strangulation.*—First stage. Congestion, various degrees from mere swelling and redness up to purple color with patches of extravasation causing a mottled look. Second stage. Inflammation, same appearances as those of first stage, but surface is dull and perhaps adherent, being covered wholly or partially with lymph. Third stage. Gangrene ; more adhesive ; surface duller ; color black or ashy ; sloughing and perforation about to occur.

ARTIFICIAL ANUS results when herniated bowel sloughs or is deliberately and freely opened by surgeon. Possibility of former event happening even a week after reduction of hernia. Then adhesions prevent intra-peritoneal extravasation. *Pathology.*—Two openings, one into intestine above, other into intestine below. Former tends to enlarge, latter to diminish. Tendency to prolapsus of mucous membrane. Irritation and excoriation of skin. Spur between the upper and lower portions of bowel. Many cases recover spontaneously. When opening is high up in small intestine, general nutrition suffers considerably by escape of chyle. *Treatment.*—Zinc ointment round aperture ; bag to catch fæces, or plug to retain them temporarily ; cleanliness. When the condition persists, operate. Divide spur gradually with Dupuytren's enterotome ; division should occupy several days. Then close artificial anus with hare-lip pins after paring edges. Fæcal Fistula is a very mild degree of artificial anus, which usually closes spontaneously. Otherwise treat it on general principles.

Reduction en masse.—In the course of taxis, hernia disappears, but symptoms of strangulation come on or remain. Bowel has slipped, not back into peritoneal cavity, but sideways between peritoneum and muscles of abdominal wall. Two varieties : in one, bowel burst through a hole in neck of sac ; in other, sac as well as bowel is misplaced. *Signs.*—If surgeon himself causes the misfortune he notes the absence of that sudden jerk with which a hernia properly reduced usually disappears. The history of the case points to the occurrence. Symptoms of strangulation remain unrelieved. *Treatment.*—Operate ; open sac ; pull bowel out of its malposition ; divide stricture and reduce. An intra-parietal sac, a diverticulum from the ordinary sac sometimes exists. A hernia may be pushed into it instead of into abdomen.

After-treatment of Herniotomy.—Chiefly negative. Rest in bed ; liquid food till the bowels have acted ; opium unnecessary ; no purgatives · enema if bowels do not act spontaneously within ten days. If peritonitis should arise, it must be treated promptly and vigorously, like peritonitis from other causes.

IRREDUCIBLE HERNIA.—*Causes.*—1, adhesion ; 2, neglect of reduction combined with hypertrophy of the herniated parts. Adhesions of the parts uncovered by peritoneum make all herniæ of the bladder and cæcum irreducible. Omentum is apt to become irreducible. *Treatment.*—Gradual compression by a bag made to lace up, as advised by Langton. Combine this with pot. iod. internally.

SPECIAL HERNIÆ.—Birkett's classification.

I. *In the Epigastrium.*—1. Diaphragmatic. 2. Epigastric.

II. *In the Mesogastrium.*—1. Ventral (also in other regions). 2. Umbilical. 3. Lumbar.

III. *In the Hypogastrium.*—1. Inguino-scrotal (labial in female). 2. Femoral. 3. Obturator. 4. Perineal. 5. Pudendal. 6. Vaginal. 7. Ischiatic.

DIAPHRAGMATIC HERNIA.—Three kinds, viz.; 1, congenital, left leaflet of centrum tendineum usually absent; 2, ordinary, abdominal viscera pass through one of the naturally deficient parts of the diaphragm, usually close to ensiform cartilage; 3, traumatic, through a wound. Birkett adds to these cases of relaxed diaphragm bulging upwards from pressure of viscera below. *Signs.*—Malposition of viscera may be detected by auscultation and percussion. Occasionally symptoms of obstruction, strangulation or impeded respiration. Perhaps history of accident.* In traumatic and congenital cases there is no use. *Prognosis.*—Traumatic cases usually fatal. Others may never even be suspected through life.—*Treatment.*—Nil.

EPIGASTRIC AND VENTRAL HERNIA are to be recognized and treated on general principles.

UMBILICAL HERNIA.—Appears commonly either in infants or fat middle-aged women. Umbilical hernia in infants, though termed "congenital," differs from congenital inguinal hernia, in having to form its own sac by pushing peritoneum before it. *Coverings.*—Skin, fat, and fascia usually matted together. Neck of sac thickened and strong. *Contents.*—Various. Stomach, small intestine, omentum. Often very large. *Prognosis.*—In infants tendency is towards spontaneous cure. Obstruction is a more common accident than strangulation. *Treatment.*—Cork and strapping; pad and bandage; proper trusses or abdominal belts for severe cases. In operating for strangulation divide the coverings very carefully. See also treatment of hernia in general, above.

INGUINAL HERNIA—Classification. I. Direct or internal. II. Oblique or external, including (1) common or scrotal, (2) congenital, (3) funicular, (4) infantile. Direct comes out internal to deep epigastric artery, *i. e.*, in triangle of Hesselbach. Oblique descends externally to deep epigastric artery, *i. e.* comes down inguinal canal. Common Scrotal Hernia has a sac altogether independent of tunica vaginalis, and usually lying anterior to it. Congenital has for its sac the unclosed tunica vaginalis testis. *Funicular.*—"Hernia into the funicular process of the peritoneum," occupies the funicular portion of the tunica vaginalis, which peritoneal process has, in this case, closed only at or near the external abdominal ring. *Infantile or Encysted Hernia.*—This occurs when the tunica vaginalis is unobliterated from the testicle up to the external abdominal ring. The sac lies enveloped in the tunica vaginalis. "Hernia en bissac" is a kind of congenital hernia which the intestine has burst through a constricted part of the tunica vaginalis. The tunica vaginalis may have been completely divided by a septum at the seat of constriction before the hernia forced its way downwards. Bubonocele is an inguinal hernia which lies wholly in the inguinal canal. *Diagnosis of congenital from the ordinary scrotal hernia.*—Congenital hernia occurs in children and youths, appears suddenly, descends rapidly, and envelopes testicle. Ordinary hernia occurs in adult age, descends slowly, and is separated from testicle. Infantile hernia, &c., are recognized after death or during operation. In operating you divide, in common scrotal hernia, congenital hernia, funicular hernia, hernia en bissac, one serous layer; in infantile or encysted hernia, three serous layers. In congenital hernia testicle is found in sac. *Diagnosis of hernia from other inguinal and scrotal swellings.*—A. Inguinal swellings.—1. Encysted hydrocele of cord, though often reducible, is otherwise altogether

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*In one case the affected side of thorax was disproportionately large.—Garlik, *Path. Trans.*, 1879.

unlike a hernia, being transparent, oval, very defined, and tense. 2. Undescended testis. Testis is, of course, absent from scrotum. It gives the characteristic pain on pressure, and is irreducible. Inflamed testis in this situation causes symptoms like those of strangulated hernia. Still the vomiting is persistent and continuous, not gushing. Diffused hydrocele of the cord, hæmatocele of the cord, tumors of the cord, may, like elephantiasis scroti, be left to the surgeon's common surgical knowledge and common sense. B. Scrotal swellings.—1. Ordinary hydrocele. Begins at bottom of scrotum, has usually no neck extending up into inguinal canal, is tense or fluctuating, transparent, without impulse, and generally of characteristic pyriform or oval shape. But hernia and hydrocele may coexist. 2. Hæmatocele. Cord defined, no impulse. Perhaps ecchymosis. 3. Varicocele. Worm-like feel. Though reducible when patient is recumbent, yet appears again when he stands up, in spite of finger placed over inguinal ring. 4. Tumors of testis. Cord may be thickened but is usually clear. Testis itself involved. Tumor heavy, opaque, perhaps hard and irregular. Of course no impulse. Often pain. *Treatment.*—See that of hernia in general. Pad of truss should cover whole of inguinal canal in oblique inguinal hernia, and should never compress cord against pubes. In operating for strangulation, constriction is mostly found either at neck of sac or at external abdominal ring.

FEMORAL HERNIA.—Hernia into the crural sheath. Almost always comes through femoral, *i. e.* crural, ring. In a few rare cases has been seen external to femoral vessels Occurs much more in women than in men. But it must not be thought that inguinal hernia is uncommon in women. In childhood and youth, hernia in females is almost always inguinal; after forty years of age it is usually femoral. For coverings, relations, etc., vide books on anatomy. *Signs.*—General characteristics of hernia. Situation of tumor; it appears below Poupart's ligament, just external to spine of pubes, and, though at first descending, eventually turns upwards and outwards in a direction parallel to Poupart's ligament. Femoral hernia is not large usually, but occasionally attains an enormous size. *Diagnosis.*—Sometimes difficult. From 1, enlarged glands, 2, psoas abscess, 3, varix of saphena. Enlarged glands have no impulse, are often multiple, may have an obvious cause, *e. g.*, an inflamed bunion. Also they can usually be felt to have no base like the neck of a hernial tumor. In psoas abscess fluctuation can often be produced from one side of Poupart's ligament to the other, that is from the thigh to the abdomen and *vice versa.* It cannot be reduced with a gurgle like a hernia. Manifest spinal disease may co-exist. Varix probably extends some distance down saphena; and, though reducible in the horizontal posture, it rapidly returns in the erect, in spite of the finger placed over the crural ring. Femoral and inguinal herniæ are distinguished from each other by their relations to Poupart's ligament and the public spine, and by the state in which the inguinal and crural rings are found. Although a femoral hernia may ascend, yet its neck is always below Poupart's ligament. *Prognosis.*—Femoral hernia, very liable to acute and fatal strangulation. *Treatment.*—Best truss probably moc-main. In cases of strangulation, flex and adduct thigh during taxis. In operating, cut upwards. Notch slightly because of danger of wounding abnormal obturator artery. Seat of stricture may be falciform process of Burns, Gimbernat's ligament, deep crural arch, or neck of sac itself. Use of term "Hey's ligament" ought to be abolished as unnecessary and confusing.

OBTURATOR HERNIA.—Very rare. Signs obscure. Fulness below Poupart's ligament, beneath rather than internal to femoral vessels. Pain down inner side of thigh. Femoral ring found normal. Age of patient usually advanced. "Symptoms of obturator hernia may be those of chronic obstruction associated with emaciation." Goodhart (Path. Transact., 1876). Operation for strangulation would be conducted on general principles with due care of blood-vessels. It would resemble that for femoral hernia, but fascia lata and pectineus would require incision.—C. B. KEETLEY.

HERNIA CEREBRI—*See Head, Injuries of.*

HERPES.—*Definition.*—Herpes is an acute vesicular disease of the skin, which runs a rapid course and is accompanied by local irritation and sometimes by symptoms of constitutional disturbance.

Of the many varieties usually mentioned under this title only three are important enough to need special description: herpes febrilis, herpes gestationis, and herpes iris.

Symptoms.—Herpes febrilis may be described as a neurotic disease, and commonly occurs as a symptom of catarrh or of pneumonia, but may be due to any condition producing a rigor, such as the passing of a catheter. Whatever may be its cause, it always appears to be produced through the influence of the nervous system, and in all its forms the temperature is slightly increased, and the patient complains of headache and *malaise*. The eruption often precedes any constitutional symptom, and may occur on almost any part of the body, but its most common sites are the lips, tonsils, uvula, mucous membrane of the mouth, palate, and more rarely the face, ears and tongue.

The eruption appears in groups, and lasts about seven or eight days. It consists of small papules, which become vesicular and which contain a clear fluid. After lasting two or three days this fluid becomes turbid, and is generally absorbed, though in some instances the vesicle bursts and crusts are formed. The vesicles themselves are situated on inflamed bases, and an itching or burning sensation always accompanies, and sometimes precedes by a few hours, the appearance of the eruption.

When herpes occurs on the lips, the vesicles are few in number, and rapidly coalesce and dry up into scabs; but when it appears on the mucous membrane of the mouth, they soon burst and leave a superficial ulceration. Again, when the vesicles form on the tonsils, uvula, or soft palate, they also burst, but leave white patches on the mucous membrane, which are liable to be mistaken for diphtheria, and this mistake is rendered more probable by a swelling of the tonsils, which is occasionally seen at the same time. Although this disease usually occurs in isolated cases, a whole family is sometimes found to be attacked by it.

As a sub-variety of herpes febrilis may be mentioned herpes progenitalis, in which the vesicles are developed on the prepuce, glans, or dorsum of the penis of the male, and on the labia or mons veneris in the female. These vesicles are generally few in number and form scabs, which last but a short time and then drop off, leaving healthy skin; when, however, the vesicles are broken by scratching, small superficial ulcers result, which soon dry up and scab; and, further, it must be noticed that when there is much induration of the part, it is difficult to distinguish the herpetic ulcer from the syphilitic chancre. Frequently, also, there is some amount of swelling, and the appearance of the eruption is often preceded by pain.

Herpes gestationis occurs in pregnant or parturient women, but is rarely seen in England. It has been recently described by Liveing and Bulkley. The rash is not purely vesicular, but consists of papules and vesicles of various sizes, from a pea to a bean, which appear in groups over the body, chiefly on the extremities. The eruption is preceded by and accompanied with severe itching, which continues after its disappearance, and by slight symptons of constitutional disturbance and considerable pains in the limbs. Pigmentation is often left after the eruption disappears. This variety lasts some weeks, and is often prolonged by relapses.

Herpes iris, described by Willan as a separate variety, is characterized by the arrangement of the vesicles in rings round a single vesicle, and two or even three rings may be seen outside each other. They do not make their appearance simultaneously, but in successive circles, and those vesicles nearest the centre often subside during the growth of fresh vesicles at the periphery. It must not, however, be expected in herpes iris that all the vesicles are to be found arranged in this orbicular manner ; it is sufficient to characterize the disease if some only are arranged in rings, whilst others appear in irregular crops ; and it must be noticed also that, though they are usually discrete, they may coalesce and form bullæ. The disease itself lasts a variable time, usually from one to four weeks, according to the number of rings formed, and is not accompanied by any constitutional symptoms. Hebra points out the tendency of herpes and erythema to behave in a similar manner in producing multiform varieties, and that herpes circinatus results from herpes iris in the same way that erythema iris results from erythema annulare. The erythematous and herpetic rashes select the same sites, for they both occur most frequently on the backs of the hands and feet, at times on the limbs, in some instances as high as the arms or thighs, but hardly ever on the trunk. Hebra, indeed, goes so far as to say that, taking into consideration the similarity of the mode of development, the course and the seat of the two diseases, he is tempted to regard them as modifications of one and the same disease.

Diagnosis.—Herpes is not likely to be mistaken for any other disease, for the vesicles are larger than in eczema, and do not spread from the periphery, and are smaller than in pemphigus. The inflamed bases on which the vesicles are seated, the rapid course of the disease, and the sense of irritation which accompanies it, are sufficiently marked characteristics to prevent mistakes.

Treatment.—No local or constitutional treatment is known to affect the course of the disease.—MALCOLM MORRIS.

HERPES ZOSTER—*See Zoster.*

HIP-DISEASE.—Morbus coxæ. Disease of hip-joint.

Causes.—Predisposing are scrofula and the ages of childhood and early youth. Exciting are local injuries, often very slight, and exposure to cold. Cause often uncertain. Affections of the generative organs sometimes cause hip-disease, probably in a reflex manner.

Varieties.—Hip-disease has been divided anatomically according as it affects the femur only or the acetabulum. In many cases both are involved. Also it may be acute, sub-acute, or chronic. Or it may be strumous or purely traumatic or rheumatic in origin. Practically it is rarely possible to say whether a given case is or is not strumous. Some diseases of the hip-joint, *e. g.*, chronic rheumatic arthritis, never have the term "hip-disease" applied to them.

Symptoms.—Three stages : 1st, inflammatory ; 2d, stage of abscess ; 3d, stage of real shortening. Inflammatory stage. Before the symptoms are well marked, the term "incipient" is used. Stiffness of joint. When patient lies on his back his knee is bent upwards. If an attempt be made to straighten it, the small of his back becomes hollow, because the pelvis moves with the femur. Wasting of limb, often a very early symptom; flattening of buttock and obliteration of gluteal fold. Pain often referred to inner side of knee. Pain is most severe when disease begins in the bone. Fulness over joint, best marked when disease begins in synovial membrane. Apparent lengthening, sometimes apparent shortening, both due to rocking of pelvis. Very rarely real lengthening due to effusion into joint. Of course the patient limps. 2d stage. Stage of abscess. The suppuration is sometimes entirely outside joint. Pus burrows, fluctuation occurs sometimes in one place sometimes in another, sinuses form. Probe very likely fails to find dead bone. Sayre's vertebrated probe useful. Situation of sinuses indicates situation of disease, whether acetabular or femoral (see "Pathology"). Before absces opens, 3d stage has usually commenced. Third stage. Stage of real shortening. This results from the gradual destruction of head and neck of femur by caries and necrosis, usually by caries. Top of trochanter ascends above Nélaton's line, a line drawn from ant. sup. spine of ilium to tuberosity of ischium. Abscesses or sinuses, lordosis, flexion of thigh on abdomen, wasting of buttock and thigh, and pain continue as in former stages. The disease naturally terminates either in death from exhaustion or amyloid disease, or in recovery with ankylosis. The ankylosis is in the flexed position and accompanied by a compensatory spinal-curve of the kind called lordosis.

Pathology.—Disease may begin either (1) in the bone near the joint, or (2) in the soft tissues, synovial membranes, or ligaments of the joint. In the latter case the disease is sometimes named "arthritic." It is a generally accepted doctrine now that the only joint-disease which begins in the cartilage is chronic rheumatic arthritis. For a description of the general changes which take place in hip-disease see Diseases of Bone and of Joints. Ligamentum teres soon gives way. Head of femur perishes by caries or by necrosis. If acetabulum is affected, it is apt to perish partially by necrosis, often becoming perforated. Even when head of femur is destroyed remains of neck of femur rarely leave acetabulum. True dislocation on dorsum ilii does occasionally occur, or, acetabulum being perforated, head of femur may slip through into pelvis. The natural tendency is towards a cure by ankylosis. In acetabular disease, sinuses usually form in buttock, or close to pubes. In femoral disease they usually open lower down thigh, especially below and in front of great trochanter.

Diagnosis.—Most cases of hip-disease are unmistakable. Sometimes difficult to distinguish incipient hip-disease from other affections which cause pain about the hip, accompanied by lameness, common rheumatism for example. In fact, many cases of hip-disease do not actually begin as rheumatic synovitis. No disease of the parts about the hip causes such stiffness of the joint; that is a great point. Pain in the knee may lead off the attention to the wrong place. Many affections, *e.g.*, curvature of spine, and hysteria, cause rocking of pelvis and apparent shortening or lengthening. In healthy people, the lower extremities are often slightly unsymmetrical.* But in such persons if one leg is much shorter than the other, the feet will probably also be disproportioned. Comparative measurements should be taken from ant. sup. spine of ilia to upper or lower end of patella or to inner malleoli. Nélaton's line, Bryant's ilio-femoral triangle. Bryant's ilio-femoral triangle is formed by a horizontal line across top of trochanter, a perpendicular line from ant. sup. iliac spine downwards, and an oblique line from ant. sup. iliac spine to top of trochanter. The lines are equal on both sides in normal persons. Enlarged bursa under psoas is very rare; and the pain, if present, is relieved not aggravated by flexing thigh on abdomen. Hip-joint disease could hardly be accompanied by such marked swelling over the joint without presenting characteristic and marked symptoms. Hysteria must be diagnosed on general principles. See Hysterical Diseases of Joints. It would really be a waste of space to give the diagnosis of hip-disease from psoas abscess, sacro-iliac disease, and congenital dislocation; for it may be assumed that the surgeon will not try to diagnose a doubtful case without taking the patient's clothes off, and manipulating carefully.

Prognosis.—Depends on stage of disease, original constitution of patient, present condition of patient, on parts actually diseased, and on age of patient. In first stage of disease, especially if symptoms point to origin in joint itself, treatment may be expected to result in recovery with or without ankylosis in good position. Scrofulous patients are very likely to become tuberculous elsewhere when the bone is affected. When necrosis or caries has occurred, prognosis is very bad as to life. It is worst in adults with acetabular disease. The only cases in which recovery without ankylosis is to be reasonably looked for, are those in which the cartilage and bone have never been affected.

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* See Garson, *Jour. Anat. and Phys.*, 1880.

Treatment.—Rest of the joint essential. Sayre's splint is supposed to make rest in bed unnecessary in many cases in which the disease has not too far advanced. Extension by pulleys and weights (3 to 10 lbs., according to age and individual particularity of patient). Long splint (long splint on sound side, weight to diseased limb); Thomas's splint, plaister cases, leather cases, &c. Treatment should be continued so long as there is any tenderness or sign of active disease and for a little longer. Limb should be straightened under chloroform, if weight fails to bring it down gradually and easily. Inflammatory reaction after this manipulation may be treated by ice or hot poultice locally, according to which seems to act best. When there are signs of struma, give cod-liver oil and iron. In suppurative stage, treat abscesses and sinuses on general principles.

Question of Excision.—When suppuration continues, patient's exhaustion increases, and there is evidence of bone-disease; and, especially if the patient's circumstances are so poor that he cannot get proper attention during long rest in bed, the surgeon is justified in operating to remove the dead bone. Still the operation has its dangers, and the resulting limb is likely to be shorter than after the natural cure. Moreover it is very difficult, sometimes impossible, to thoroughly remove pelvic necrosis. For operation, *vide* article Excision.—C. B. KEETLEY.

HIP, Dislocation of—*See Dislocations.*

HIP-JOINT, Excision of—*See Excision of Joints.*

HIRSUTIES.—Hirsuties, or an excessive growth or hair on parts where normally only fine down occurs, may be either congenital or acquired.

In the congenital variety the excessive growth may be either diffuse, covering the whole surface or a large portion of it, as in the so-called "hairy men," or localized to certain smaller areæ, as in moles or nævi.

In the acquired variety large hairs, more or less numerous, develop in places generally covered only with lanuginous hairs, such as the upper lip or chin of women, the areole of the nipple, or on warts. The irritation of the skin by blisters or stimulating applications produces in some individuals an abundant growth of long downy or bristly hairs.

The process consists usually of an increase in number and a closer aggregation of the hairs, which are occasionally thick and bristly. The condition does not effect the general health' and is only troublesome in consequence of the disfigurement it produces.

Treatment.—When the hairs are scanty and long, epilation is the best mode of removing them; but when they are numerous, and are situated on the lip or chin of women, a depilatory paste, containing orpiment and slacked lime or sulphide of calcium, may be applied every three or four days.—MALCOLM MORRIS.

HODGKIN'S DISEASE.—This disease is characterized by a peculiar white deposit in the spleen, sometimes also in the liver, kidney, and lungs, and by an enormous enlargement of the lymphatic glands throughout the body, accompanied during life by a remarkable anæmia and disposition to anasarca.

The enlargement of the glands appears to be a primitive affection of these bodies, the consequence of a general increase of every part of the gland, and pretty uniform throughout. In conjunction with this affection of the absorbent glands, the spleen shows enlargement of its gland elements. In malignancy the disease takes a place between cancer and tubercle, and death occurs through derangement of the glands.

General ill-health, paleness and sallowness of complexion precede any other signs. Lymphatic glands are subsequently found enlarged, as in the neck, axillæ and groins. Weakness is felt, which increases; and the patient can no longer walk nor run up a stair. He totters in the legs from feebleness. Sexual appetite is lost, and flesh is lost; so that emaciation with marked anæmia exists—pale sclerotic and feeble pulse. The legs become œdematous.—WM. AITKEN.

HOOPING COUGH.—Hooping cough is generally regarded as an infectious disease, depending upon a *specific poison*, which may travel a considerable distance through the atmosphere, or be conveyed by fomites. The contagium is chiefly given off in the breath. The disease commonly occurs in an epidemic form, but may be sporadic. It may be communicated by infection before the characteristic "whoop" is developed. A second attack is scarcely ever observed.

The chief predisposing causes of pertussis are childhood, especially after the second year, a cold and damp season or climate, and exposure to all causes of "cold."

Most authorities regard hooping cough as a peculiar catarrh of the mucous membrane of the air-passages attended with hyperæsthesia; others think that it is entirely or partly due to some morbid condition in connection with the vagus nerve. There may be evidences of catarrh in fatal cases, but frequently these are absent. Those who advocate the nervous origin of the disease have described signs of inflammation about the vagus nerves, enlarged bronchial glands pressing upon these nerves, or congestion of the medulla oblongata and its membranes. In most cases, however, none of these appearances are observed. The most important morbid conditions associated with hooping cough are those which are of the nature of complications, namely, bronchitis, lobular collapse of the lungs, acute insufflation or emphysema, dilatation of the bronchi, and catarrhal pneumonia. Rarely croup or meningitis may be present.

Symptoms.—The period of incubation for hooping cough is uncertain, but Dr. Squire has found evidence of the development of the disease as early as from two to four days after exposure to infection. The symptoms are divided into certain stages.

First or Catarrhal Stage.—At the commencement hooping cough presents no characteristic signs, there being merely pyrexia, which is often sharp, accompanied with signs of catarrh, namely, running from the nose, sneezing, redness of the eyes, frequent and usually severe paroxysms of cough, at first dry, but soon attended with a peculiar expectoration. This stage may last from two days to two or three weeks or more, and its duration and severity will indicate the probable duration and intensity of the entire attack.

Second or Spasmodic Stage.—The fully established disease is characterized by peculiar fits of spasmodic cough. A paroxysm generally sets in abruptly without any obvious cause, being in many cases preceded by a sensation of tickling in the throat, or some other unpleasant feeling. The cough is very severe and distressing, consisting of a number of short, quick, spasmodic or convulsive, and forcible expiratory puffs, followed by a prolonged, clear, shrill inspiratory sound or "whoop," these alternating for a variable number of times; if the fit is of very long duration, the cough at last becomes almost inaudible. It is usually terminated by the expectoration of a considerable quantity of thick, viscid, clear fluid, which may also be discharged through the nose, and not uncommonly vomiting takes place. Breathing being interfered with, the child presents the appearances characteristic of non-aeration of the blood and venous congestion, and in prolonged attacks may become almost asphyxiated. Usually there is a feeling of much exhaustion, with soreness about the muscles of the chest after a paroxysm, but these sensations soon pass away. As accidental occurrences may result bleeding from the eyes, nose, mouth, ears, or rectum; involuntary discharge of urine and fæces; hernia or prolapsus ani; or convulsions. Physical examination of the chest during a fit reveals that air does not enter the lungs properly. The physical signs of pulmonary complications can often be detected.

The frequency and duration of the paroxysms vary greatly, the one being generally in proportion to the other. As a rule the disease becomes intensified up to a certain point, attaining its height at about the end of the third, fourth, or fifth week, and then it subsides gradually.

During the intervals the patient is usually apparently well, but in severe cases there may be prolonged exhaustion, languor and debility, loss of appetite, headache, sleeplessness, pyrexia, and other symptoms; or various complications may give rise to their special clinical phenomena.

To Dr. T. Morton (*British Medical Journal*, June 10th, 1876) belongs the credit of having independently observed and drawn attention to the frequent occurrence of ulceration about the frænum linguæ in cases of hooping cough. The phenomenon had been long known on the Continent, but in this country it had attracted little notice previous to Dr. Morton's observations; since then, however, it has come into considerable prominence. Professor Henri Roger has recently presented an elaborate report on the subject, and the following are the main practical conclusions arrived at: Sublingual ulceration is not an essential phenomenon of pertussis, and is very variable as to its frequency, depending on the violence of the paroxysms of cough, and on the disposition of the teeth in the first dentition. On the whole it occurs in about half the cases. There is no fixed time at which the ulceration is observed, but it is rarely seen before the third week from the time of infection, and in most cases several days later; it is never observed before the paroxysmal stage of hooping cough is established, and occurs in direct proportion to its severity. The ulceration is never noticed in infants before dentition, but occurs more readily in those of ten or twelve months than in older children; it is never met with in adults. When the frænum linguæ is short no ulcer is produced; while if the arrangement of the teeth is anomalous, other parts of the tongue may be lacerated. There is no preceding vesicle or pustule, but the frænum often presents a somewhat vivid redness, and then an erosion, or a linear division of the mucous membrane, with an appearance of granulations. At the point of section of the frænum there is sometimes seen a transverse depression, sometimes a kind of pimple, or a small white and yellow patch, often of a pearly aspect. In other cases a small, median, oval ulcer is observed, with irregular edges, and a pale or reddish-gray base. This may extend some distance on each side of the frænum, as well as in depth. Generally the ulcer is covered with a whitish or grayish exudation. From the facts observed by him, Roger concludes that the sublingual ulceration in hooping cough is in no way specific, and that it does not hold any causative relation to the disease, which some have supposed to exist. Its origin is purely mechanical, the lesion being due to the impulsion forwards of the tongue in its hyperæmic state against the lower teeth during the paroxysms of coughing, when the frænum is easily cut by the sharp lower incisors. The phenomenon may be of use in diagnosis in cases of pertussis, where the nature of the disease is not thoroughly declared, as this is the only complaint in which the cough is violent enough to propel the tongue against the teeth.

Third or Decline Stage.—There is no sudden transition to this stage, but a gradual diminution in the frequency and intensity of the paroxysms, while the cough loses its special characters, and expectoration becomes more easy, the sputa assuming an opaque and muco-purulent appearance, resembling the expectoration of ordinary bronchial catarrh; at the same time vomiting ceases. The general health also improves. Finally the cough ceases altogether and the patient is convalescent.

Complications and Sequelæ.—Some of these are directly due to the cough, others are accidental. The chief complications and sequelæ include bronchitis, which may become capillary; lobular collapse; emphysema or acute insufflation; rupture of air-vesicles, followed by subcutaneous emphysema; catarrhal pneumonia; pleurisy; phthisis; acute tuberculosis; croup; convulsions; cerebral apoplexy; meningitis; hernia; gastritis or enteritis, with obstinate vomiting and diarrhœa; and other specific diseases.

Duration and Terminations.—The entire duration of an attack of hooping-cough is very variable, but from six to eight weeks is stated to be the average. The third stage may continue for an indefinite period, and a relapse is not uncommon. Most cases terminate in recovery, but death is not an uncommon event, being occasionally due to the severity of the disease, but usually to complications. Some permanent organic mischief often remains behind, or the chest may become deformed.

Prognosis.—Whooping-cough is always a serious disease, and calls for a guarded prognosis. The general circumstances which increase its gravity are, that the patient is very young; suffering from dentition, or the subject of constitutional debility; residence in a large town; poverty and its consequences; and epidemic prevalence. The complaint is more dangerous in proportion to the number and severity of the paroxysms, to the degree of pyrexia, and to the gravity of the complications present.

Treatment.—Numerous specific remedies have been brought forward for the treatment of hooping-cough, but they all fail in most cases, the disease running its course unchecked, though it may be mitigated in its severity. The chief indications are: 1. To prevent or subdue the paroxysms of cough, at the same time care being taken that there is no accumulation of secretion of the bronchial tubes. 2. To obviate all complications, and treat them as they arise. 3. To attend to the general health, as well as to the state of the various secretions. 4. To promote convalescence. The means of carrying out these indications will now be considered.

1. It should be a constant rule, in the case of children, to pay immediate attention to any chest symptoms, and this applies to the early period of hooping-cough. The patient should at the outset be kept in a warm room; be well clad with flannel next the skin; and have warm drinks, in order to promote perspiration. An aperient may be given, and a mixture containing liquor ammoniæ acetatis with vinum ipecac. should be administered. When the disease is established, the most important remedies are sedatives and antispasmodics, for the purpose of allaying the paroxysms of cough. These must be given in minute doses, and their effects closely watched. The most efficient are belladonna, in the form of tincture, extract, or powdered leaves or root; opium, syrup of poppies, or morphia; hydrocyanic acid; conium; hyoscyamus; tincture of lobelia; cannabis indica; ether; chloroform; valerian; and musk. The alkaline carbonates are believed to be useful, and either of these may be combined with one of *the above remedies. In my experience I have found most benefit from a combination of vinum ipecac.* with hydrocyanic acid (m ¼ to m ½), or with

tincture of belladonna. Some advocate the employment of inhalations of chloroform or ether.

2. Of the various specific remedies advocated the chief are alum (which is in some cases decidedly valuable); dilute mineral acids, especially nitric; cochineal; arsenic; nux vomicaor strychnine; bromide of potassium or ammonium; infusion of clover; quinine in small doses often repeated; tincture of myrrh; and repeated emetics. The last are useful if there is any tendency to accumulation of secretion in the bronchi. Metallic salts, viz., those of copper, zinc., iron, and silver, have been recommended by various authorities, and may be useful in cases which tend to assume a chronic form. Inhalations of carbolic acid have also been advocated, and their use seems to have been attended with marked success in some instances.

3. Local applications have been tried, viz., touching the larynx with a strong solution of nitrate of silver; counter-irritation over the chest or along the vagus nerve; friction over the chest with opium, belladonna, and other liniments; and the application of a belladonna plaster. These measures are of doubtful benefit.

4. The general management of patients suffering from hooping-cough is important. In bad weather they should be confined to the house altogether, or even to one room, maintained at a uniform temperature; but in favorable seasons it is decidedly beneficial for them to be out in the fresh air during the warmer part of the day. The clothing must be sufficiently warm. It is important to attend to the diet and to the state of the alimentary canal; should dentition be proceeding, the teeth must be looked to. Children who are sufficiently intelligent should be taught to suppress unnecessary cough as much as possible.

5 Complications must be watched for and treated as soon as they arise. Inflammatory affections do not bear lowering measures well in hooping-cough, and supporting treatment is indicated in the majority of cases.

6. During convalescence tonic remedies, especially iron and quinine, are useful. Change of air is also found to be highly beneficial in prolonged cases, or a sea-voyage. Good diet is needed, and a little wine is useful sometimes. There is no protection against hooping-cough, except in keeping away from the source of infection.—FREDERICK T. ROBERTS.

HORDEOLUM—*See Eyelids, Diseases of.*

HORNS—*See Papillomata, under head of Tumors.*

HOUSEMAID'S KNEE—*See Bursæ, Enlarged.*

HUMERUS, Fracture of—*See Fractures.*

HYDROA.—*Definition.*—In addition to the varieties of herpes, some mention must be made of a rare disease of a kindred nature, termed hydroa by Bazin, who divides it into vesicular hydroa, vacciniform hydroa, and bullous hydroa. It is defined as a chronic disease of the shin, occurring in arthritic subjects, and characterized by groups of vesicles or bullæ.

Symptoms.—Vesicular hydroa first appears as small, round, deep-red spots, with well-defined edges, varying in size from a lentil to a threepenny piece, and sometimes surrounded by a rose-colored area. The next day a vesicle forms in the centre of the spot, filled with a transparent yellow fluid, which in a day or two is absorbed from the centre, when the vesicle itself becomes a black scab.

Sometimes, especially during the cold weather, the fluid in the vesicle is so rapidly absorbed that there is only to be seen a white or yellow macula, formed by loose epidermis in the centre of a red disk. The eruption is usually accompanied by no symptoms of constitutional disturbance except feverishness. It generally makes its appearance on the backs of the hands, wrists, and front of the knees, but is occasionally found on the mouth, or even on the conjunctivæ. However, in the former case it does not occur on the mucous membrane till the third day, and then it is surrounded by a violet areola and scabs earlier.

Each outburst of vesicles lasts about four or five days, but, as they are constantly repeated, the disease usually continues for about three or four weeks, and even then relapses sometimes occur. Vesicular hydroa is a disease peculiar to gouty subjects of both sexes, from twenty to thirty years of age, but generally attacks men. It is most common in spring and autumn, cold and variations in temperature having a marked influence on its appearance and course.

Vacciniform hydroa and bullous hydroa differ from the variety described in that the vesicles of the former disease become umbilicated, and in the latter meet and form bullæ.—Malcolm Morris.

HYDROADENITIS is an inflammation of the sweat glands, or rather the connective tissue about them. This condition commences by the appearance of small lumpy swellings like blind boils, but which do not suppurate, though they remain some time painful, tender, enlarged, and of a dull red color, like huge acne indurata spots, only that they possess no central pustular point or follicular orifice.

Treatment.—This consists in allaying the local inflammation by ordinary measures, such as hot-water bathing and the free use of a calamine lotion, and subsequently painting with collodion, or stimulating the places when indolent with the application of the acid nitrate of mercury: or, should this not succeed, subcutaneous puncture may be employed. In some cases which occur in strumous subjects, the disease is greatly influenced for the better by a course of cod-liver oil.—*Epitome of Skin Diseases, Fox.*

HYDROCELE.—An accumulation of serum forming a swelling in connection with the testicle or spermatic cord.

Varieties.—1, Hydrocele of the tunica vaginalis testis (common hydrocele). 2, Hydrocele of the cord (sometimes called "encysted hydrocele of the cord"). 3, Encysted hydrocele (frequently called "encysted hydrocele of the epididymis," or "of the testicle"). 4, Diffused hydrocele of the cord. 5, Congenital hydrocele. 6, Infantile hydrocele.

Hydrocele of the Tunica Vaginalis Testis.—*Causes.*—Middle age, weak constitution, and gout predispose. Injury and orchitis excite. In most cases there has been no known exciting cause. *Signs.*—A scrotal tumor, smooth, oval, pyriform, or globular (often constricted in the middle); elastic, tense or fluctuating, transparent or semi-transparent (rarely quite opaque). No connection with abdomen. Cord free near abdominal ring. No impulse on coughing. Penis gets "absorbed" as it were, into tumor. *Diagnosis.*—*Vide* Hæmatocele and Inguinal Hernia. *Treatment.*—1, Palliative; 2, Radical cure. Palliative=tapping with trocar and canula, or mere use of discutient lotions+suspensory bandage. In tapping make out position of testicle by palpation, by assistance of patient's sensations, and by use of candle and stethoscope. Grasp tumor firmly in left palm. Plunge trocar obliquely upwards and backwards into juncture of middle and lower thirds of hydrocele. The fluid usually collects again. Lotio ammoniæ hydrochlor. (ʒ j to ℥ vj) used as a discutient. Radical cure—First empty the hydrocele, then inject two drachms of port wine or of tinct. iodi and and water, equal parts. Let the injection flow out after a minute or two. Platinum canula should be used for tinct. iodi. Lewis recommends carbolic acid and glycerine, aa ʒ ss., instead of iodine and says it is less painful. Treatment by seton not to be recommended. *After-treatment.*—Bed for two or three days. *Pathology.*—A serous dropsy of the tunica vaginalis, probably of chronic inflammatory origin. The cure acts by checking the secretion of the tunica vaginalis, and rarely results in the production of adhesions.

Hydrocele of the Cord.—Its pathology is probably that of a dropsy of a small obliterated part of the tunica vaginalis funiculi. It may sometimes be an independent cyst. Its appearances are quite characteristic. It is transparent, feels like a pigeon's egg, not more elastic, and slips up and down between the fingers with great mobility. You may fancy that you have reduced it into the inguinal canal, when suddenly in a humerous way, it may be discovered half-way down the cord towards the testicle. Occurs in the young. *Diagnosis.*—Only in rare cases, when it extends right into inguinal canal, and patient is so fat as to hide transparency, can this affection be mistaken for hernia. *Treatment.*—Tap and inject with tinct. iodi and water, equal parts. Before injecting be sure that the case is not one of "congenital" hydrocele.

Encysted Hydrocele.—*Signs.*—Those of cyst attached to the testicle, usually to the head of the epididymis. *Pathology.*—Acyst containing sometimes pure serum, but frequently a mixture of serum and seminal fluid. An opening has often been found between the seminal tubules and the cyst. The cyst may originate from a dilated seminal tubule, or from a dilated cavity in the connective tissue, or, according to Osborne, from enlargement of the "hydatid of Morgagni." *Treatment.*—Same as that of ordinary hydrocele.

Diffused Hydrocele of Cord.—Unknown to living surgeons. Described by Pott. But hydrocele of cord sometimes receives this name if it forms a long, rather ill-defined tumor.

Congenital Hydrocele.—Tunica vaginalis funiculi is opened as in hernia into tunica vaginalis testis, but the open process contains peritoneal fluid instead of intestine. *Treatment.*—Puncture with fine trocar, and then try to close the opening by the pressure of a truss.

Infantile Hydrocele.—Occurs in infants in whom tunica vaginalis has only closed at external abdominal ring. *Treatment.*—Discutient lotions. Puncture. If it is certain that there is no communication with peritoneal cavity, iodine injection may be employed in obstinate cases. Many cases disappear with very little treatment.—C. B. Keetley.

HYDROCEPHALUS, Acute—*See Tubercular Meningitis.*

HYDROCEPHALUS, Chronic.—Effusion of fluid in the sub-arachnoid space, so that the arachnoid becomes a sac filled with serum; or generally distending the ventricles of the brain, and differing from cerebrospinal fluid in containing more albumen; occurring chiefly among children, and when occurring later in life, generally dating back to childhood. The tissue of the brain in contact with the fluid; especially the commissural parts, are apt to be broken down by œdema into a thin white pulp (hydrocephalic or white softening).

The first thing that strikes us on examining those patients who suffer from the chronic form of hydrocephalus is the enormous size of the head. The adult head averages about twenty-two inches in circumference; but in a case of a hydrocephalic child, the head at three months had attained the enormous size of twenty-nine inches in circumference. The head of Cardinal, a celebrated hydrocephalic man about London (long in St. Thomas's Hospital, and who afterwards died at Guy's,)measured thirty-three inches and a half. There are instances, however, in which the cranium has been found unusually small, and of a conical shape, the sutures being closed before birth; and in these cases the children are still-born, or die shortly after delivery. When the disease comes on at later periods of life, and after the sutures are closed, the size of the skull is natural, the cavities within the brain distended, and its substance wasted and anæmic.

The membranes of the brain are generally thickened, and the fluid found effused either into the cavity of the arachnoid, into a cyst, or into the ventricles of the brain. When the fluid is contained within the cavity of the arachnoid, the brain is sometimes so compressed that there are instances in which hardly a vestige of that organ remains. A singular and rare variety of this affection occurs when the arachnoid sometimes protrudes though the fontanelle or open suture, and the dura mater and integuments yielding, a pyramidal bag, with its apex downwards, forms externally, which hangs low down the back like a jelly-bag. When the effused fluid is contained in the ventricles, those cavities are exceedingly dilated. The convolutions have no depressions, but appear unfolded. The corpus callosum is much raised, the septum lucidum is torn and destroyed, or the gray commissure destroyed, and the white commissure elongated to the extent of an inch, so that the ventricles communicate. The parts at the base of the brain also, as the corpora striata and thalami optici, have scarcely any form. In fact, the brain seems expanded into a large sac, in which the medullary and cortical substances are so confounded as to be undistinguishable.

The quantity of fluid contained in the cranium varies from a few ounces to pounds. In the case of Cardinal it was found to exceed ten pints(nine pints in the cavity of the arachnoid, and one pint in the ventricles). Other cases have been, however, recorded in which the quantity has amounted to twenty pints.

Authors have greatly differed as to the nature of the disease. Some, considering it a mere increase of fluid from functional activity, have named it dropsy of the brain, most often congenital, and others have as constantly referred it to an inflammatory origin ; but they have generally concurred in describing an acute and chronic form of the disease. The symptoms during life are due to the mechanical action of a variable amount of fluid, causing enlargement of the head.

The blood circulation and nutrition of the fundus of the eye also undergo great changes; which may, to some extent, be explained by the compression of the cerebral substance from accumulation of fluid. As the fluid collects and the pressure increases, there occur:—(1.) Greater vascularity of the papilla and choroid, with dilatation of the veins; (2) An increase in the number of the vessels of the choroid; (3.) Partial or total serous infiltration of the papilla; (4.) Atrophy of the choroid and its vessels; (5.) Atrophy of the optic nerve, which may be complete.

There are two forms of chronic hydrocephalus, the internal and the external, or hpdrocephalus in which the membranes protrude. In either case when this disease is fully formed, whether it be congenital or subsequent to birth, the child is generally of the most feeble intellect, irascible, often epileptic, and of extreme muscular debility, so that, if not palsied, he is hardly able to walk.

Treatment.—Calomel in quarter or half-grain doses twice a day; also at the same time inunction of an eighth or a fourth of an ounce mild mercurial ointment or similar inunction of the oleate of mercury into the shaven scalp once in twenty-four hours, may be of service in the early period of this disease. The head is to be kept constantly covered with flannel to prevent any check to perspiration. After a lapse of six or eight weeks, diuretics in the form of acetate of potash, or tincture of squills, or both, are to be given with the mercury. Counter irritation by issues or setons in the neck, which are to be kept open for months, may be useful.

Hygienic measures ought to be of the first importance in the rearing of delicate children, so as to prevent if possible the development of those conditions which lead to effusion of fluid within the cranium.—WM. AITKEN.

HYDRONEPHROSIS—*See Kidney, Dropsy of.*

HYDROPERICARDIUM.—*See Pericardium, Dropsy of.*

HYDROPHOBIA.—A disease which develops primarily only in the dog, and from unknown causes, but which is communicable by inoculation with the saliva of dog, cat, man, or any other animal who may suffer from it.

Symptoms in Dog.—Two forms (or two stages ?), viz.: 1, a raving madness; 2, a quiet madness. Certainly these stages do sometimes follow each other in the same dog. Or three stages may be distinguished: 1, of dullness with restlessness; 2, of fury; 3, of paralysis. In the first stage the animal wanders about in a fidgety, uncomfortable manner, is evidently ill, and looks suspicious, unhappy, and distrustful. In the second stage, much of the fury is evidently due to hallucinations. He bites, but it is often at imaginary enemies, and he may still be mindful of his master's voice. In the third stage, paralysis makes the voice muffled or inaudible, the jaw drops, and the legs totter and fail. Finally death comes from exhaustion. The mad dog rarely shuns water, but laps it without swallowing.

Hydrophobia in Man.—Proportion of bitten cases attacked, estimated by Trousseau at one in two, by Billroth at one in twenty! Period of incubation: six weeks to more than a year. Rarely less than six weeks. *Symptoms.*—Firstly, great irritability, excitement, and restlessness. Spasms on attempting to swallow occur sometimes, but rarely, in this stage. Irritability and sensitiveness to light, sound, etc., increase and become excessive. Soon the slightest causes produce spasms. Then gradually comes the fear of water, together with unspeakable thirst. Sleeplessness. Terror of the spasms and their causes. Actual madness occurs rarely. Appearance of most fearful anxiety. Hoarseness. Frothing at the mouth. Severe tetanic spasms now from time to time, suspend respiration; and, finally in one of these, the patient dies asphyxiated. Note the different ways in which death occurs in the dog and in man, for in the former it comes by exhaustion. *Diagnosis.*—1. From tetanus. In tetanus there is a certain amount of persistent spasm, in hydrophobia there are intervals of complete relaxaion. Tetanus is also a quiet disease, so to speak, and is unaccompanied by horror of water, even although the sufferer may be unable to drink. 2. From hysteric or neuromimetic hydrophobia. In the sham disease there is dysphagia, but no alarming spasm of the respiratory muscles. *Prognosis.*—Hopeless. *Pathology.*—Congestion of spinal cord has been observed with collection of leucocytes around the capillaries. *Treatment.*—All remedies hitherto tried have been vain. Suffering may be alleviated by rest, darkness, and perhaps by anæsthetics. Try tracheotomy. With regard to prophylaxis, cauterization should be done, early if possible, but better late than never. Surgeons of great ability have named various limits of time at which they say cauterization ceases to be of any use. These limits differ considerably, and, in my humble opinion, it has yet to be shown on what sufficient grounds they have been fixed. One may ask for demonstration that the poison does not remain near the wound during the period of incubation. Cauterization may be painful and obnoxious; but what are these considerations when compared with the faintest chance of preventing the most horrible of diseases? Vesicles ("lyssi") appear near frænum linguæ between third and twentieth day after bite. It has been recommended to examine patient twice a day during this period, and lay open and cauterize the lyssi as they appear. Trousseau supports this recommendation.—C. B. Keetley.

HYDROPHTHALMIA.—*Dropsy of the Eye.*—This affection is caused, at times, by an increase in the quantity of the aqueous, at others, of the vitreous, humor. In the former case, the iris is concave anteriorly and pushed backwards. In the latter it is convex, and pushed forwards.

Most commonly the disease seems to depend on both humors at the same time. Hydrophthalmia sometimes affects both eyes; at others, only one. Children are more exposed to it than adults or old persons. The treatment must vary according to the cause; its longer or shorter duration; greater or less extent, &c. Hence, according to circumstances, hydragogue medicines, purgatives, general and local blood-letting, blisters, setons, moxa, cupping glasses, fomentations, collyria, and fumigations of different kinds, have been employed. When all means fail, and the disease continues to make progress, the fluid may be evacuated by a puncture made with a cataract needle at the lower part of the transparent cornea.—DUNGLISON.

HYDROPS ARTICULI—*See Joints, Diseases of.*

HYDROTHORAX (*Sub-acute Pleurisy*).—*See Pleurisy.*

HYMEN, Imperforate.—*Definition.*—Closure of vaginal orifice by excessive development of the hymen.

Causes.—Congenital.

Symptoms.—If adult, retention of menses.

Signs.—Hymen is seen closing the vaginal orifice.

Diagnosis.—As above.

Prognosis.—Generally favorable.

Treatment.—Occasionally the hymen may seem to close the vagina, when on examination of the patient on her back the anterior free edge of the hymen may be found embracing the posterior wall of the urethra. A slight incision backwards will then free it. If, however, the hymen is really imperforate, great care has to be taken in incising it, as the evacuation of the retained menses may give rise to decomposition before the fluid has all passed away, which may lead to fatal septicæmia. A free opening should be made, and the thick viscid fluid allowed to drain away gradually, fequent use being made of antiseptic injections.—HEYWOOD SMITH.

HYOID BONE, Fracture of—*See Fractures.*

HYPÆSTHESIA—*See Anæsthesia.*

HYPERÆMIA OF SKIN.—The hyperæmic affections, characterized in general by an undue injection of blood into the capillaries, small veins and arterioles of the superficial layer of the skin, fall conveniently into the two subdivisions of active and passive.

In the former of these the skin has usually a brighter red color, and the appearance is accompanied by a feeling of irritation, as of burning or itching, by moderate swelling, and sometimes by slight elevation of temperature; while in the latter the hue is more livid, the temperature lowered or only normal, and a feeling is experienced of numbness or even anæsthesia. The division between these two forms is merely one of convenience, as the active hyperæmia may culminate in the passive (congestion) or they may be present side by side on the same portion of skin, as in thrombosis or embolism, when the central par is in a state of congestion and the marginal in one of active hyperæmia.

Active hyperæmia as defined presents varieties which may be classed under the two headings of:

1. Traumatic, excited by irritants.
2. Symptomatic, arising in the course of other diseases, probably under the influence of reflex irritation of the nervous system.

The former are usually called erythemata, a term to which a special meaning has been already assigned, and, as they are characterized chiefly by an increased vascularity, with little or no exudation, the more suitable name of hyperæmia will here be used.

a. Hyperæmia (erythema) mechanica arises on portions of skin exposed to undue pressure, rubbing, or scratching. It is usually transient, but if the irritant be repeatedly in action the skin is prone to become the seat of congestion or of inflammatory change, and the eruptions of exanthemata appear upon it with special brightness.

b. Hyperæmia calorica arises on parts exposed to the sun's rays, or to winds, as a diffuse bright-red discoloration, which in time becomes darker and usually ends in brownish pigmentation and slight desquamation. Transient degrees of heat, and either warm or cold baths, excite a fugitive hyperæmia.

c. Hyperæmia ab acribus seu venenata is produced by the slight action of chemical irritants, the juice of certain plants, mustard, etc., and readily develops into exudation and inflammation if the cause be prolonged.

Symptomatic hyperæmia may be excited by physical causes such as anger, shame, etc.,—*i.e.*, in the form of a blush or of a more diffuse and slighter injection—or it may arise in the course of dentition or gastric disturbances in infancy, when it has been termed erythema, roseola infantilis, strophulus, etc., or vaccinia, variola, enteric fever, cholera, rheumatism, and other diseases, when it has been variously named erythema or roseola vaccinia, etc.

Passive hyperæmia may be either general, under the influence of heart or lung disease, causing mechanical congestion, or local, from pressure on the veins or deficient arterial vis a tergo. The two latter, which have been termed livedo mechanica and livedo calorica respectively by Hebra, will now be described.

Livedo mechanica, arising under the influence of pressure from tight clothes, garters, varicose veins, etc., appears a purplish-red, bluish, or grayish-black discoloration of the skin, disappearing under pressure, with slight swelling if there be no œdema. When the cause is removed it gradually subsides.

Livedo calorica is the name applied to the bluish-red or purplish tint seen on the nose, ears, etc., of persons exposed to the cold, and to the dark lines about half or three-quarters of an inch wide which form serpentine figures on the extremities and trunk. The latter are chiefly visible on the extremities, and, but less obviously, on the trunk, and though fading on pressure, disappear only when the patient is warm. Occasionally in the midst of the purplish background vermillion-red patches are observable, varying in size from ⅛ to ¼ of an inch, and sometimes surrounded by a pale zone.

If the action of cold be prolonged, it may in weakly, chlorotic persons give rise not only to congestion, but to exudation and an eczematous condition to which the name chilblain has been applied.—MALCOLM MORRIS.

HYPERÆMIA, Follicular—*See Follicular Hyperæmia.*

HYPERÆSTHESIA.—Augmented or perverted sensibility has the same relation to the sensory part of the nervous system as spasms and convulsions hold to the motor, and, indeed, the two conditions are not unfrequently associated. Hyperæsthesia means strictly exalted sensibility—a condition in which the various organs of sense are more readily afflicted than they should be by impressions which are made upon them, or in which the sensorium is more appreciative than natural of the impressions which are conveyed to it from the organs of sense. Practically, however, exalted sensibility is scarcely, if ever, distinct from painful sensibility. The hyperæsthetic eye cannot bear bright light; the hyperæsthetic ear is affected painfully by powerful, high, or discordant sounds; the hyperæsthetic skin shrinks from the slightest pressure, or from mere contact. Hyperæsthesia in this sense is not uncommon; it is frequently observed in hysteria, sometimes in the early period of febrile disorders, occasionally in inflammatory and other affections of the central nervous organs. It is a *common feature* in hemiparaplegia, in which case not only is the paralyzed *ide generally* still sensitive, but its sensibility often becomes painfull acute; it is common, too, in inflammatory affections involving the skin. Under the general term, dysæsthesia, may be included a large number of abnormal sensations, referable to the ordinary sensory nerves, to the nerves of special sense, and to the sympathetic system, or, at all events, to the afferent nerves connected with the visceral organs. Among perverted sensations referable to the skin may be included sensations already adverted to as frequently indicating the advance of anæsthesia, namely, numbness, sense of coldness, tingling, formication, and the like; as also itching, burning, cutting, stabbing, crushing, shooting, aching, constrictive and other pains, which are so common, and arise under so many various conditions that it would be a waste of time to endeavor to enumerate them all. True neuralgic pains are usually of a shooting character, flash with momentary intensity along the fibres of the affected nerve, and occur in paroxysms composed of momentary shocks following one another in rapid succession. Other varieties of dysæsthesia are those which are manifested in relation to the visceral organs, among which may be included the besoin de respirer, which attends asthma and cardiac disease; the agony of angina pectoris; painful thirst or craving for food; gastralgia, enteralgia, and various indescribable sensations referable to different parts of the body, of which nervous and other patients complain, or which constitute many of the varieties of the so-called epileptic aura. Dysæsthesia of the organs of special sense may be indicated by the appearance of subjective phenomena referable to these organs: of the eye, by the appearance of sparks or flames, or other objects which may even present definite forms, be endowed with motion, and assume the visible attributes of living objects; of the ear, by the perception of sounds, such as humming, buzzing, singing, the ringing of bells, violent explosions, and even words and actual conversation; and of the nose, by the perception of odors; of the taste, by the perception of flavors, for the development of which no extrinsic cause exists.—JOHN SYER BRISTOWE.

HYPERIDROSIS.—*Definition*—A condition characterized by excessive sweating, which may be general or local.

Symptoms.—General sweating may occur in the course of any of the acute constitutional diseases, such as acute rheumatism, when the whole surface of the body may be bathed in perspiration.

Local sweating may affect the hands or feet, or one hand or foot, or even one-half of the body, and produces a sodden appearance, such as is seen after prolonged immersion in water. From the constant irritation of the sweat eczema may result.

Treatment.—This should depend on the cause, internal remedies, such as belladonna, being required if the sweating is general. Sponging with vinegar and water is useful to check the nightsweats in phthisis. Locally the part should be constantly washed with yellow soap and water, and bathed with a lead or tannic acid lotion.—MALCOLM MORRIS.

HYPERMETROPIA—*See Refraction.*

HYPERTROPHY.—Increase in size of the issues of a part, not the mere natural result of growth in youth. Sometimes accompanied by increased development of the individual microscopic constituents of the tissue: *e. g.*, when the gravid uterus enlarges the individual mucus-cells also grow. *Causes.*—Exercise, irritation, hyperæmia, general over-feeding, special over-feeding, certain special diseases. Irritation may be direct or indirect. An example of indirect irritation as a cause is hypertrophy of breast from uterine irritation. Irritation certainly acts partially, if not wholly, by producing hyperæmia through reflex inhibition of vaso-motor system. By special over-feeding is meant the excessive deposit of fat, which may result from taking fat-forming food in excess. As examples of hypertrophy from special diseases may be cited the large joints of rickety children and the thickened skin of elephantiasis scroti. *Treatment.*—Remove case. Favor venous circulation. Pressure. Treat special diseases. Operative measures. Vide various articles in this book on hypertrophy of particular organs and parts.—C. B. KEETLEY.

HYPOCHONDRIASIS.—*Definition.*—A disease of the nervous system, of unknown and possibly varying seat. It is markedly hereditary, being one of the transformed neuroses which descend from a parent stock strongly tainted with insanity. Its principal feature is mental depression, occurring without apparently adequate cause, and taking the shape, either from the first, or very soon, of a conviction in the patient's mind that he is the victim of serious bodily disease. The sufferer's belief in this disease is so firm, that he describes minutely the symptoms which, as he fancies, indicate its existence. But he may place the imaginary malady in almost any organ of the body, and he usually describes some symptoms which are anomalous, or even incredible. Finally, hypochondriasis may be evoked by a real organic disease acting as an irritant to an hereditarily predisposed nervous system ; in this case, the anomalous nervous symptoms may mask, and even conceal, the occurrence of serious changes in some viscus.

Symptoms.—This phrase is pre-eminently appropriate to the phenomena of hypochondriasis. Of physical signs we have almost none to guide us; and this is in perfect agreement with the position which this disorder holds in the category of diseases generally. All is in the region of symptoms. For the most part, too, the symptoms are subjective only : still there are features which the experienced physician can detect, and which can hardly be simulated by a malingerer.

The most important external feature of hypochondriasis is this : that without any sufficient reason for such conduct, and without any signs of intellectual insanity, the patient is observed to concentrate his attention on some particular organ of his body, and to fancy that it is seriously diseased. This concentration of attention is often preceded and accompanied by notable depression or variability of his spirits, with a tendency, on the whole, to depression ; this is not always the case, however, for there is sometimes no antecedent symptom connected with the general mental state. In many instances the patient's first sufferings take the form of what he himself considers dyspepsia, but which is in fact little more than flatulence, from the formation of large collections of gas in the stomach and bowels. Along with this flatulence, there are sometimes appearances which give a superficial color to the idea of a primary stomach derangement ; the tongue, for instance, is often pasted and coated, and there may be foul breath ; the appetite is not unfrequently ravenous, capricious, or well-nigh lost ; there is generally obstinate constipation ; in rare cases there are even attacks of vomiting.

More commonly there is an antecedent mental change, the character of which it is at first difficult to seize, and which forms one of the grounds for the modern practice of including hypochondriasis in the varieties of actual insanity. Before any local symptoms have declared themselves, the patient has already become changed in his disposition ; in most cases, perhaps, the change is simply in the direction of despondency or vague alarm, for which he can give no reason. It is remarked by alienists that the mental condition, even thus early, is characterized above all things by an expansion of the self-feeling, a pre-occupation of the patient with his own condition, to the exclusion of other interests and affections. This is true ; but it appears to us that the self-concentration is more like that of a person in the preliminary stage of an acute inflammation or fever, the nature of which is not yet declared, than the egotistic alteration *of character which* seems to lie at the basis of insanity, and which probbly depends directly upon minute changes taking place in the cortical substance of the brain. It is a real bodily sensation (though at first indescribable) which enchains the sufferer's attention; and before long this vague feeling is exchanged for a positive localized sense of uneasiness or actual pain.

Sometimes the early mental state is one not merely or chiefly of despondency, but characterized by suspiciousness and irritability of temper, with quick changes from high spirits and loquacity to moody silence. In any case, after a time, the patient not only exhibits in his aspect and conduct the general uneasiness from which he suffers, but begins to complain of definite subjective symptoms. Probably the most common of these is pain of a gnawing or burning character, or else a sense of great though vague uneasiness at the pit of the stomach. But in fact any part of the peripheral distribution of the sensory nerves may be the apparent seat of painful sensation; and besides this there is often a generally heightened sensibility of the skin. Both the active pain and the heightened sensibility of (uncomplicated) hypochondriasis are subjective, and resemble the similar phenomena which are so common in hysterical women, in vanishing when the patient's attention is powerfully diverted from them. The painful sensations of which hypochondriacs complain are very acute; and their severity concentrates the attention of the sufferer exclusively upon them, increasing the apparent egotism of his disposition. But it may here be remarked, that the heightened self-feeling of hypochondriasis does not partake of the despondency of true melancholia, still less of the character of other forms of insane egotism. The patient (as observed by Leidesdorf), though depressed in mind, not only wishes to get rid of his malady, but has great faith that he will do so; a faith which suffers repeated shocks, indeed, from the non-success of particular remedies, but quickly revives in favor of some new mode of treatment. The eagerness with which he pursues the means of cure is the true cause of the limitation of his thoughts.

Next to pseudo-dyspeptic symptoms, and the occurrence of pains or anomalous feelings at the pit of the stomach, the most common morbid sensations in hypochondriasis are, probably, formication of the skin, and burning pains in the course of particular superficial nerves. It is noteworthy that, so far as we are aware, the nerve-pains most frequently assume the burning type, rather than the lancinating, throbbing, or aching forms which neuralgia more commonly takes. A common occurrence is the sudden shifting of the pains, or the sense of formication from one part of the body to another, or their sudden extension from a small area which they first affected over almost the whole surface of the body. It is important to distinguish, from these pains, those which occur in the early stages of locomotor ataxy; and, in fact, this may be difficult in some instances, for the ataxic pains also are singularly shifting. However, the pains of ataxy are confined so strictly to the limbs (usually to the feet, thighs, and nates), that this of itself constitutes a difference from hypochondriacal pain. Another very frequent subjective symptom is the feeling of pain or great but undescribable uneasiness deep in the heart, or the lungs, or the liver, the bladder, or the rectum. The development of the subjective symptoms is very often seriously influenced by tbe fact that the patient is driven by his misery to consult medical books, or to pester his medical friends with questions bearing on his sufferings: his defective knowledge and distorted fancy leads him to apply, *a tort et a travers*, the scraps of information which he picks up, and to imagine, successively, that he has discovered in himself the signs of one, two, or half a dozen serious organic diseases. Attention being thus directed to particular organs, the subjective' symptoms naturally increase and multiply, and the emotional excitement produced also frequently sets up severe functional disturbance, such as flushings of the face, abdominal pulsation, palpitation of the heart, partial suppression of bile and jaundice, or bilious diarrhœa; symptoms which still further confirm the sufferer in the belief that he is laboring under serious organic disease. A very common delusion is the belief that there is fatal heart disease; and a scarcely less frequent one is the persuasion of the patient that he is impotent from spermatorrhœa; this last is, of course, greatly fostered by reading pseudo-medical treatises. In the case of patients whose family is strongly tainted with insanity, the anomalous sensations often assume a type which approaches to hallucination or illusion (as when there is a belief that a serpent is writhing about in the entrails, &c., &c.), or the judgment becomes affected to such a degree that the patient entertains preposterous delusions (as that he is made of glass and in danger every moment of being broken, that he is being magnetized, that people are conspiring to poison him, &c.) The delusions sometimes are confined, at any rate for a time, to one or two organs, but are, nevertheless, so extravagant that it would really seem no paradox to say that the patient has a mad stomach, a mad liver, or a mad bladder, while on all other matters his intellect remains healthy, and often usually acute? It is probable that any portion of the nervous centres may be functionally disordered in hypochondriasis, and thus give rise to disturbances of this kind in the organs with which they are related. But on the subject of the Protean symptoms of hypochondriasis it is really unnecessary to enlarge further, and we may refer those who desire to read a truthful and highly picturesque description of them to the pages of Burton*, to say nothing of more modern writers.

Diagnosis.—The diagnosis of hypochondriasis, from maladies superficially resembling it, is proverbially beset with difficulties, and the practitioner can only gain confidence in his decision on the more doubtful cases by means of long experience. Nevertheless, the general principles on which his judgment must be formed are not very difficult to state.

If the anomalous character of a patient's subjective symptoms point in the direction of hypochondriasis, the very first subject of inquiry should be the family history. A well-defined history of insanity in the race would at once indicate the probability that the patient's sensations were partly illusory and not referable to their apparent site. On the other hand, a decided history of the absence of insanity and of the other severe neuroses from the family during two or three previous generations would still more strongly suggest that the case was not one of hypochondriasis. The next point for investigation would be the mode of commencement of the illness. A history of the primary occurrence of severe bodily symptoms, whether in the shape of pyrexia, of disturbance of hepatic or gastric functions, or of pain in the course of nerves, is unfavorable to the diagnosis of hypochondriasis unless these phenomena were preceded or accompanied by psychical changes such as have been already described. Even a more chronic development of capricious pains, of formication of the skin, of flatulence, palpitations and the like, is not specially indicative of hypochondriasis, unless there is unusual anxiety on the patient's part, and an egotistic tendency to dwell on his sufferings. A great deal may be gathered from considerations of age and sex. Hypochondriasis is pre-eminently a disease of adult and middle life; it is hardly ever seen before puberty, and it very rarely makes its first appearance after the age of fifty. It is greatly more common among men than among women; in the latter sex it appears to be replaced for the most part by hysteria. Still, hypochondriasis may occur in women, and the question of diagnosis from hysteria in such a case becomes important and may be very difficult. Beyond all other circumstances which favor the probability of hypochondriasis is the fact of a strong hereditary taint of insanity. The age at which the symptoms commence is important; thus the first appearance of hysterical phenomena nearly always takes place between the ages of fourteen and thirty, or else at the grand climacteric, and has very commonly a marked relation to those changes in the nervous system which correspond with the changes of the sexual apparatus; whereas the development of hypochondriasis is especially associated with the circumstances of middle life—in the rich and idle with the *tedium vitæ* of a purposeless existence; in the poor and anxious with the cares of a family, and perhaps with the added misery of a conscious failure in efforts to support relations and dependents. Severe moral and emotional shocks may be followed either by hypochondriacal or hysterical disorder; but the latter is the infinitely more probable result in women who are not descended of markedly insane families, and especially in women who lead busy lives.

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* Anatomy of Melancholy, pp. 270-274.

One of the most important questions in diagnosis is the decision whether if hypochondriasis be present, there is not at the same time some organic visceral disease; for it sometimes happens that the first sign of the occurrence of such disease is an outbreak of hypochondriacal symptoms, the patient being hereditarily predisposed to the latter disorder, and his nervous system excited to morbid action by the irritation of the new organic processes which are going on. Of the diseases which have been known to produce such an effect, structural changes of the liver, and next to them, structural changes of the stomach, are the most frequent examples; and after these, aneurisms of the great vessels, valvular diseases of the heart, angina pectoris. It is unnecessary here, even if there were space, for us to go into the characteristic symptoms of these organic diseases. The first feature which may lead the physician to suspect the existence of organic visceral disease, in the midst of symptoms which he feels sure are hypochondriacal, is the persistence of some one complaint by the patient, *e. g.*, of pain in a particular locality; especially if this be combined, always in the same order, with other symptoms that belong to the suspected organic disorder, and with which the patient is not likely to be acquainted so as to be mentally influenced to reproduce them. Thus if, along with a fixed complaint of pain in the præcordia increased by swallowing, there is the regular occurrence of regurgitation of some of the food very shortly after deglutition, it is a case for inquiry as to the possible existence of cancerous or other stricture of the cardiac end of the stomach, &c. It is needless to say that physical signs, when they are present, are the most valuable helps in discerning organic disease which is masked by hypochondriasis; yet even here there is need of caution. For instance, the occurrence of hardness and tumidity in the epigastrium or the hypochondrium, in such a form as closely to imitate a scirrhous tumor (even on repeated examinations), may be produced by spasmodic contraction of one or both recti; in such a case the administration of chloroform would at once dismiss the suspicion by dissolving the "phantom" tumor. A circumstance which is always of doubtful interpretation is the occurrence of wasting, especially if combined with jaundice. If this takes place with rapidity, it can hardly be owing to hyperchondriacal disturbance of digestion and assimilation, but is probably due either to the generally depraving effect of cancerous or tubercular taint, or to direct interference with nutrition from the mechanical effects of ulcer, stricture, or tumor, upon some of the chylopoietic viscera. The combination of insidious and unsuspected malarial poisoning with hypochondriacal tendencies may produce formidable difficulties in diagnosis, which can only be overcome by careful study of the patient's past history, sometimes by the discovery of enlarged spleen, and above all by the effects of anti-periodic medicines. Another variety of blood-poisoning, which in hypochondriacal patients may be somewhat masked, is chronic alcoholism; but it has been shown in another article in the present volume, that the symptoms of the latter complaint are, after all, tolerably distinct and recognizable from their peculiar grouping, and even in a hypochondriac they may be generally identified.

A more serious difficulty in diagnosis than any which has yet been mentioned is the distinction between certain forms of hypochondriasis and true melancholia. Given a patient with a decided family history of insanity, with a mental condition marked with a strong tendency to dwell on complaints of bodily misery, and with dyspepsia and flatulence, it may be very difficult to say whether or not the case will pass into true melancholic insanity. The following case will give a good idea of the occasional uncertainty. A postman aged forty-three, a widower, was much over-worked, and especially harassed by having to sort the letters in the morning before he started on his beat, a task which had to be hurriedly done, and hence gave him much anxiety lest he should make mistakes. He applied for relief from dyspepsia and flatulence and bilious diarrhœa, but at the same time complained that his spirits were dreadfully low, that he had thoughts of suicide, and that he believed he had "something alive in his inside." A simple tonic mixture of mineral acid and bark, combined with the moral influence of encouraging assurances from the physician, did this patient so much good that he soon seemed perfectly well, and remained so for some months. He then got married again, and his marriage apparently embarrassed his means, though not seriously; but his despondency now returned in the form of a belief that he and his family would have to go to the work-house (of which there was really not the least danger), and the impulse to snicide again became very urgent. At the same time his dyspepsia and bilious diarrhœa returned. He applied for medical relief, was ordered the same treatment as before, and was encouraged to hope for a speedy cure; but the very next day he attempted suicide by completely severing the whole of his genitals from his body with a razor. He was taken to St. George's Hospital, and with great difficulty kept alive while the wound healed. Six weeks after his discharge from the hospital he appeared before his former attendant, looking fat and fresh-colored, but more despondent than ever; indeed plainly insane. He was then lost sight of, but there could be little doubt that he would get worse, and, if not carefully watched, would commit suicide.

Such a case as the above has little to separate it from hypochondriasis except the one important feature of the early occurrence of suicidal despondency; but this feature would probably be sufficient justtification for a decided diagnosis. It is only where the hyponchondriac patient has been exhausted by a long continuance of his sufferings and rendered hopeless by the failure of a thousand attempts at cure, that he turns his thoughts to self-destruction, and by that time he may be considered really insane. Indeed, the hypochondriac proper regards the idea of suicide with the utmost repulsion and disgust.

There is no serious difficulty in distinguishing simple hypochondriasis from the other forms of insanity.

Prognosis.—The prognosis of hypochondriasis varies extremely, not so much with the apparent severity of the symptoms as with the circumstances under which they arose, the length of time during which they have already persisted and above all the degree to which the patient's family has been tainted with insanity. But in general it may be said that the younger the patient, the shorter the time during which he has suffered, the less that the nutrition of the body has deteriorated, and above all, the less of decided family taint of insanity that can be traced, the more hopeful is the aspect of the case; and *vice versa.*

The Treatment of hypochondriasis consists of the use of moral ar constitutional remedies and of remedies for symptoms.

It is obvious that the first duty of the physician is to encourage the hypochondriac to forget his woes; but nothing is so difficult in practice, and that for the best of reasons. It is a fallacy to suppose that the sufferings of the patient are unreal; on the contrary, they are most vividly real, and it is impossible that he should forget them till they cease. Yet the mind has a reflex influence upon the bodily disorder, which may be as effective for good as for evil; and this fact may be taken advantage of. The key to the moral treatment is the breaking down of the patient's morbid-self-concentration, and this object may be achieved to some extent in many cases by a change in the course of his daily life. The class of patients with whom this may be most readily carried out are those in whom the constitutional tendency to hypochondriasis is aggravated by the *ennui* of an idle life: for these an active career or pursuit of almost any kind is an immense gain; only the new occupation should be one which forces them to mix with the world. The isolated activity of the student is no real diversion from the fancies of hypochondriasis, as the case of Dr. Johnson, and of many other famous intellectual workers, abundantly proves. It is needless to say that all actively depressing influences should be removed, such as immoderate venereal indulgence, of whatever kind, or alcoholic intemperance. On the other hand, the influence of new emotions which tend to lift the patient out of himself can scarcely fail to be beneficial; and it would be a real good fortune to a hypochondriac if he could fall in love in a natural and healthy manner, or if he could interest himself warmly in philanthropic schemes or other plans of public usefulness. And, above all, something like a police supervision should be exercised as regards his studies, in order that he may be rigorously kept from the perusal of medical or other books which might remind him of his miseries; for though we do not believe that these things can create hypochondriasis, yet they can certainly prevent its cure. It is well understood, however, that no good can be effected by simply laughing at his narrative of suffering, or bantering him on his fancifulness; on the contrary, it is necessary for the physician to be interested and to believe in the reality of his painful sensations. If the patient once thinks that the doctor is taking pains to get at the secret of his troubles, he will be inclined to accept the first word of encouragement the latter throws out; and the reflected influence of reviving hope will be certain to assist recovery.

The constitutional treatment is to be directed towards improving the general nutrition; and the task here is partly that of aiding the primary process of digestion of food, and partly that of rendering more active the processes of decomposition and exchange in the tissues generally. The hypochondriac either has a deficient, a capricious, or a ravenous appetite, but in any case the primary function of digestion is almost always markedly impaired if the disease has lasted for any length of time; and when this depends on a want of tone mainly, or a condition of irritation of the stomach (such as is indicated by a coated tongue, with a red or strawberry tip), the use of vegetable bitters and mineral acids will often do great good. Defective secondary assimilation, which will be especially indicated by the condition of the urine, is generally much benefited by the use of cod-liver oil for a rather prolonged period, if the remedy can only be tolerated by the stomach. In cases where the oil cannot be borne, cream, butter, or some other form of fat, will often agree, and may be made the first stage to inducing the stomach to retain the cod-liver oil. Nor is it by any means only in cases where there is general emaciation that the administration of fat does good; it is probable that the nutrition of the nervous tissues is directly improved by this treatment in many instances. The administration

tless, of great use to some anæmic patients, and sea-bathing
ars to exercise a very beneficial influence; but the first of
is generally most efficacious when taken in the form of the
rs of some foreign spa; and there is good reason to doubt
ineral waters and sea-bathing do not owe most of their ap-
to the moral influences of travel and change of scene and
The more specific nervous tonics, such a strychnia, quinine,
phosphorus, seem to exercise but a doubtful and accidental influence.

The treatment of symptoms is a thing to be eschewed in hypochondriasis, with certain special exceptions. While, however, it is desirable to avoid concentrating the patient's attention on parts which are the apparent seat of mere morbid sensations, it is important to relieve him of the distress caused by real (though mere functional) disorders of the digestive system. Decided activity of the stomach should be counteracted by the use of antidotes, of which none is more efficacious than magnesia powderosa, in ten-grain doses, thrice daily, or Brandish's solution of potash, ten minims three times a day, with gentian or cascarilla. The excessive or too long continued use of alkalies is; of course, to be avoided. 'The distressing flatulence, which is often one of the earliest, and also one of the most annoying symptoms, is greatly relieved by creasote (one drop in a pill twice or thrice a day), or the infusion of valerian. Alcoholic tinctures should be very cautiously employed, if at all; for there is a real danger of the patient coming to appreciate the comforting sensations given by the spirit so highly that he gradually takes to drink; this is especially true in the case of hypochondriacal women, as it notoriously is in hysteria. We may add that it is particularly likely to occur in patients exhausted by masturbation, or other venereal indulgence. The constipation, which is frequently so obstinate and troublesome, must be remedied, if it be anyhow possible, without the use of drugs; for it is most dangerous to stimulate the patient's love of self-doctoring in the direction of the habitual use of purgatives. The prescription of fruit, green vegetables, &c., as articles of daily food, is a far more desirable mode of accomplishing our object; and the habitual practice of active bodily exercise is a powerful aid to the same end.

The question of *quantum et quale* of physical exercise which may be beneficial in hypochondriasis forms a fitting subject with which to conclude our remarks on treatment, since this is a remedy which directs itself alike to the moral, the constitutional, and the symptomatic condition of the hypochondriac. The only rule, however, which it is possible to lay down for our guidance in this matter, is the direction to employ physical exercise in such a manner and to such an amount as shall fully exercise the muscles without ever producing severe fatigue, and shall also be amusing to the patient. It is a very dangerous error to carry exercise to the fatigue point; a short continuance of such malpractice will usually suffice to produce a profound deterioration of the vigor of the nervous system, and an aggravation of the hypochondriacal fancies.—SIR W. JENNER.

HYPOPION—*See Cornea, Diseases of.*

HYPOSPADIAS—*See Penis, Diseases of.*

HYSTERIA.—*Pathology and Etiology.*—Hysteria is a very complex morbid condition of the nature of which it is impossible to speak definitely. It belongs to the nervous disorders, but its exact seat cannot be localized, though probably the brain is most disturbed. No characteristic pathological change has been discovered, but there is probably some nutritive derangement of the entire nervous system. The attempt to localize the primary disorder in the sympathetic ganglia, and to attribute the phenomena observed to vasomotor disturbance, has no sufficient foundation.

Hysteria is infinitely more common among females, beginning usually from 15 to 18 or 20 years of age, but sometimes at a much earlier or later period, in exceptional cases only developing at the change of life. Young girls, old maids, widows and childless married women are the most frequent subjects of the complaint, and its manifestations cease after marriage. Hysterical fits are more common about the menstrual periods. These facts have led many to consider the hysterical condition as being primarily connected with some disturbance of the sexual organs or functions which affects the nervous system. It has thus been attributed to malpositions of the uterus, undue sexual excitement and unsatisfied desire, venereal excess, and disordered menstruation in the way of menorrhagia, amenorrhœa, or dysmenorrhœa. Charcot attributes great importance to ovarian hyperæsthesia as a cause of hysteria. That uterine and ovarian disturbances do help greatly in exciting hysterical attacks in a large number of instances cannot be douhted, but many eminent authorities deny that these constitute the essence of the complaint. Its frequency in women is probably due to the inherent conditions of their nervous system, often aggravated by their mode of existence. The general system may be disordered by many conditions, but the sexual functions assume an undue prominence in the mind, and thus any disturbance in connection with these functions produces an exaggerated effect. In many cases of hysteria there is nothing wrong about the generative organs or functions, while it occurs often enough in married women with families. The improvement which frequently takes place after marriage may be accounted for by the change in habits, thoughts, purposes, occupation and general surroundings which this event usually involves.

Hysteria is in some instances distinctly traceable to digestive disturbances, especially long-continued constipation with accumulation of fæces. Causes referable to the mode in which girls are brought up, and to their general habits of life, aid materially in its production, such as want of useful occupation, indolent and luxurious habits, overpetting and spoiling, subjection to the petty worries of fashionable life, keeping late hours at parties, or reading sentimental novels. Temperament and hereditary predisposition to nervous affections may have some influence, but the latter may often be explained by the patient imitating a hysterical mother. In not a few cases hysteria results from depressing influences, such as long-continued anxiety or grief, disappointed affection, or overwork with bad feeling and improper hygienic conditions. It may further depend upon some definite chronic disease, either local or general. In some instances the condition named hysterical can only be attributed to wickedness and perversity.

The hysterical state is now and then observed in males, but infinitely rarely an actual fit of hysteria. The subjects of this condition are usually from 35 to 50 years of age, and its causes are excessive venery or masturbation, overwork with long-continued worry and anxiety, excessive and prolonged mental labor, senile degeneration, or commencing chronic cerebral disease.

The exciting cause of the first hysterical fit is generally some powerful and sudden emotional disturbance, such as a fright, but this may be very slight if the patient has previously been in a state of mental restraint, with pent-up feelings, or has been subject to depressing influences for a considerable period. Subsequent paroxysms also are liable to arise from a much slighter disturbance than that which brought on the first attack. Suppressed laughter may lead to very severe fits of hysteria. Occasionally they result from physical disturbance, such as injury, loss of blood, or some acute illness.

Symptoms.—It is impossible to give even an outline of the varieties of *clinical phenomena which may be* presented in cases of so-called hysteria.

There is scarcely a complaint which may not be simulated. In most cases, however, the prominent features are an undue excitability of the emotions, with defect in the power of the will and intellect; alterations in the general cutaneous sensibility, and in the special senses, usually in the directions of hyperæsthesia and dysæsthesia; and a tendency to involuntary muscular movements, or to some other disturbance of the motor functions. It will be necessary to describe first the characters of certain paroxysms or hysterical fits, and then to point out some of the principal phénomena which may be noticed in the hysterical state.

THE HYSTERICAL FIT.—As a rule a fit of hysteria occurs when other persons are present, and never comes on during sleep. The attack is not sudden, but gradually worked up to, the patient generally having time to place herself in a comfortable position, and to adjust her dress; it is often preceded by sighing, sobbing, laughing, moaning, nonsensical talking, gesticulation, or a feeling of globus hystericus, but not by any peculiar cry. During the actual fit there may be apparent unconsciousness, but this is not complete, as can be determined by touching the conjunctiva; while the patient is generally aware of what is going on around, and looks out from under her eyelids occasionally. Spasmodic movements are observed, varying from slight twitchings in the limbs to powerful general convulsive movements, or almost tetanic spasms. Patients often struggle violently and throw themselves about, while the thumbs are frequently turned in, and the hands clenched. During these movements, which may last only a few moments, or for an indefinite time, with or without intermissions, there is no lividity of the face or other sign of interference with respiration. Breathing is noisy and irregular, while gurgling and spluttering sounds are frequently produced in the throat and mouth. The pupils are not dilated; in many cases slight internal strabismus is observed, and the eyes are turned up from time to time. The pulse is normal. There is no biting of the tongue, and rarely any foaming at the mouth. The paroxysm generally terminates with crying, laughing, sighing, or yawning, and is followed by a feeling of exhaustion, but not usually by coma, though in rare instances the patient falls into a kind of prolonged trance. Frequently abundant eructations of gas takes place, and there is often a copious discharge of pale watery urine. Rarely an attack is followed by a state of hysterical mania, in which the patient is not responsible for her actions.

THE HYSTERICAL STATE.—The chief deviations which so-called hysterical patients may present may be considered as they affect the mental, sensory, and motor functions respectively.

a. Mental.—There is defect of will and of mental power, while the emotional functions are not under proper control, being very readily excited, and tending to lead to exaggerated actions. Some patients say they cannot perform various acts, such as standing, walking, or speaking, which they do perfectly well when they forget themselves. Frequently the spirits fluctuate very rapidly and without cause, from morbid cheerfulness to despondency, and the hysterical patient sobs, sighs, cries, or laughs without adequate reason. Ideation and thought may be overactive in some respects, but the general intellectual vigor is much impaired. Many hysterical patients talk a great deal of nonsense. They have an exaggerated feeling of self-importance, seek attention from others, and are as a rule never so pleased as when they become objects of attraction or sympathy, or are creating a sensation, which accounts for "fasting-girls," trances, some cases of supposed somnambulism, and allied conditions. Many are very restless, irritable, and impatient. Others, however, seem simply indifferent to all around, and remain melancholy, silent, motionless, and apathetic for long periods together, caring nothing about dress or anything else. In some cases a form of mania sets in. Hysterical patients are strongly disposed to take to drinking to excess.

b. Sensory.—Commonly a condition of general exaggerated sensibility, hyperæsthesia, or nervousness exists, both as regards cutaneous sensation and the special senses, an unusually slight stimulus being recognized or producing an undue effect. Further, there is often a condition of dysæsthesia or of painful sensation from slight irritation. This is evidenced chiefly by cutaneous tenderness in certain parts, sometimes intense, especially in the left side; along some portion or the whole of the spinal column, slight pressure over which will often cause severe pains to shoot to distant parts; around the joints and over the abdomen. The tenderness is greatly diminished by taking off the patient's attention, and it is very superficial, signs of suffering being elicited by a slight touch or a pinch of the skin, but not when steady and firm pressure is made, or when a joint is rudely jogged. Dysæsthesia from slight stimuli may also be evinced in connection with the special senses. Spontaneous pains are commonly complained of in various parts, of a more or less neuralgic character, frequently described as very intense, and being especially seated at the top or back of the head, here often assuming the characters of clavus hystericus; in the left side, along the back, over the sacrum or coccyx, and in the joints. Paræsthesiæ, such as formication, numbness, tingling, flashes of light, tinnitus aurium, or a peculiar smell or taste, are also common. A curious sensation often complained of is that named globus hystericus, which is a feeling of constriction or of a "ball in the throat," either fixed there and giving rise to the sensation of choking, the patient making all kinds of ineffectual efforts to get rid of it, or ascending upwards from the epigastrium, or even from below this region. In exceptional cases hypæsthesia or even complete anæsthesia of the skin and deeper structures, or of the special senses, is observed. Anæsthesia is generally limited in extent, and irregular in distribution, but there may be hemianæsthesia, or the loss of sensation is confined to the lower limbs, or may be generally distributed. Hysterical hemianæsthesia may be complete or incomplete. There is often analgesia, with or without insensibility to heat and cold. Its characteristic features, when the hemianæsthesia is complete, have been described by Charcot and others as follows: There is a distinct line of demarcation separating the anæsthetic from the healthy part, often corresponding closely to the median line; the affected side is comparatively cold and pale; there is a more or less permanent ischæmia, and in intense cases there may be a difficulty in inducing bleeding by pricking the anæsthetic part with a pin; the mucous membranes are involved as well as the skin; the organs of the special senses are affected to some extent on the anæsthetic side, and in connection with vision the phenomenon called achrōmatopsia may be observed in some cases; the viscera do not seem to be implicated, but, on the contrary, ovarian hyperæsthesia is observed on the anæsthetic side. If paresis or contracture supervenes, it shows itself on the affected side. The hemianæsthesia is mostly permanent, but presents variations in degree and in the intensity of its phenomena, some of which are also liable to fluctuate. Patients may be quite unaware of the existence of this symptom. Charcot attaches great importance to ovarian hyperæsthesia or ovarialgia in cases of hysteria, to which he attributes the following characters: It is indicated by pain in the lower part of the abdomen, usually felt on one side, especially the left, but sometimes on both, and occupying the extreme limits of the hypogastric region. It may be extremely acute, the patient not tolerating the slightest touch; but in other cases pressure is necessary to bring it out. The ovary may be felt to be tumefied and enlarged. When the condition is unilateral, it may be accompanied with hemianæsthesia, paresis, or contracture on the same side as the ovarialgia; if it is bilateral, these phenmena also become bilateral. Pressure upon the ovary brings out certain sensations which constitute the aura hysterica, but firm and systematic compression has frequently a decisive effect upon the hysterical convulsive attack, the intensity of which it can diminish, and even the cessation of which it may sometimes determine, though it has no effect upon the permanent symptoms of hysteria (Charcot). The bladder or rectum may be affected as regards their sensation in cases of hysteria, leading to great accumulation of urine or fæces, of which the patient is not aware.

c. *Motor.*—Voluntary movements are generally defective, and the power of the will over the muscles is weakened; while all kinds of involuntary movements are exaggerated and very readily excited, namely, those due to emotions, ideas, sensations, reflex irritation, and organic causes. The hysterical patient starts suddenly from any slight disturbance, rushes about under the influence of some notion or other, and does various other silly acts. Spasmodic movements or fixed rigidity of different muscles are not uncommonly observed, independent of fits of hysteria, while cramps are very common, as well as spasms of internal organs. Occasionally some form of motor paralysis is noticed; generally it follows a hysterical paroxysm, and is limited to one limb, or more often a part of it, but may be more or less hemiplegic, paraplegic, or even general in its distribution. As a rule sensation is not impaired in the paralyzed part; the paralysis is incomplete; nutrition is not at all impaired, or only slightly after long duration of the paralysis; while electric irritability is usually unaffected, though electric sensibility may be lessened, and now and then both are diminished or lost. Sometimes rigid flexion of one or more joints is observed, difficult to overcome,which is evidently partly due to voluntary opposition by the patient, and when it is overcome the limb rapidly assumes its former position, sometimes flying back with a sudden spring or jerk. Hysterical paralysis is liable to rapid changes, and may cease suddenly. Under chloroform it completely disappears, and power is restored. The important diagnostic marks of hysterical hemiplegia are that it is usually incomplete; that the tongue and face are rarely involved, though there may be ptosis; that the manner of walking is different from that characteristic of true hemiplegia, there being merely a dragging of the leg without any swinging movement, while the toes are raised; and that when the patient is made to bend forward, the arm is held back. In paraplegia also the paralysis is rarely complete, and one leg is more affected than the other, generally the left; movement of the limbs can often be readily performed in the recumbent posture, but when an attempt is made to walk, the patient being well supported on either side, all power and control over the muscles seems to be gone, and she falls if the support is removed, but generally manages to recover herself suddenly when near the ground. The bladder and rectum are usually unaffected. Aphonia is a frequent symptom in hysterical patients, resulting from laryngeal paralysis. Here there is no alteration in the quality of the voice as a rule, but it becomes a mere whisper, and if the patient is asked to make an effort to speak, even the power of whispering may be lost. This aphonia often comes on and disappears with remarkable suddenness, especially under the influence of a strong emotion. Some hysterical patients refuse even to attempt to speak. A curious enlargement of the abdomen is observed sometimes, constituting the so-called phantom tumor. This region presents a symmetrical prominence in front, often of large size, with a constriction below the margin of the thorax and above the pubes. The enlargement is quite smooth and uniform, soft, very mobile as a whole from side to side, somewhat resonant but variable on percussion, and not painful. Vaginal examination gives negative results; and under chloroform the prominence immediately subsides, returning again as the patient regains consciousness.

Most hysterical patients are out of health, many of them being weak and anæmic. It is a remarkable fact, however, that even when they eat but a very small amount, nutrition often does not seem to fail. Among the numerous symptoms complained of in different cases may be mentioned: a. Digestive disturbances, especially flatulence, borborygmi, copious eructations, cardialgia, depraved appetite, fulness after food, obstinate constipation, intestinal colic or gastralgia. b. Circulatory disorders, many of them due to vasomotor disturbance, such as palpitation, tendency to syncope, epigastric pulsation, throbbing of vessels, coldness of the extremities, sudden flushing and heat of the face. c. Respiratory symptoms, for example, a sense of oppression across the chest; fits of hurried and labored breathing, sometimes assuming a very serious aspect; spasmodic, irritable, dry cough, of long duration, and having a peculiar squeaking, barking, or howling quality; hiccough; and spitting of blood. d. Menstrual disorders. e. Disorders of micturition. There may be great irritability of the bladder, with frequent micturition; or in other cases dysuria is present, the urine being retained. Oliguria or even total suppression of urine may be a transient phenomenon in hysterical cases; and Charcot believes that hysterical ischuria may occur as a permanent symptom, in connection with which repeated vomitings take place, the ejected matters occasionally, it is said, presenting the appearance and exhaling the odor of urine, and yielding on chemical analysis a certain quantity of urea. This condition is not accompanied with any of the signs of uræmia. Many authorities doubt the reality of its occurrence, and in most cases it is unquestionably merely a pretended symptom.

The exact grouping of the phenomena above described is extremely variable in different cases, and also in the same case from time to time. The hysterical state may be permanent. or it only breaks out at intervals, with greater or less intensity. It is in connection with hysteria that the peculiar phenomena supposed to arise from applying different metals to the surface of the body have been noticed.

HYSTERO-EPILEPSY.—A few observations may be made here with reference to the condition which has been termed hystero-epilepsy or epileptiform hysteria. In this condition paroxysms occur, characterized by great intensity of the convulsive phenomena, combined with certain more or less marked features which recall the phenomena of epilepsy. The cases thus denominated present various characters. In the group, which is the most frequent, the hysterical seizures and epileptic fits remain distinct—hystero-epilepsy with distinct crises, and as subdivisions of this group Charcot gives the following: *a.* Epilepsy is the primary disease, upon which hysteria becomes grafted, most frequently at the period of puberty. *b.* Epilepsy is superadded to hysteria. This variety is much rarer. *c.* Combinations of a secondary order—(i.) Convulsive hysteria coexists along with petit mal. (ii.) Convulsive epilepsy is superadded to some of the phenomena of non-convulsive hysteria, *e. g.*, contracture, anæsthesia, etc. In another group the attacks are of a mixed character,—hystero-epilepsy with combined crises. This class of cases is thus described by Charcot: *a.* The mixed attack is from the outset epileptiform hysteria. *b.* The hysterical aura always constitutes a prominent symptom. It occupies the abdomen, being generally of long duration, and does not affect the head from the first, or one of the extremities, as takes place in epilepsy with aura. *c.* In the convulsive attack there is at first an epileptic phase—a sudden shriek, extreme pallor, loss of consciousness, a fall, distortion of the features, then tonic rigidity seizes on all the members. This rigidity is rarely followed by the clonic convulsions, brief in duration, limited in oscillation, predominating on one side of the body. The face may become greatly tumefied and violet-colored. There is foaming at the mouth, and the foam is sometimes bloody. Finally, great relaxation of the muscles may follow, with coma, and stertorous respiration during a less or greater length of time. *d.* To this first phase the clonic phase succeeds. Then all is hysteria; great gesticulations, having a purposive character, supervene, and sometimes violent contortions are made characteristic of the most various passions, such as terror, hatred, etc. At the same time paroxysmal delirium breaks out. *e.* The termination of the attack is marked by sobs, tears, laughter, etc. These different phases do not always succeed each other in so regular a manner; they get entangled occasionally, and now one, now the other predominates.

As to the nature of these hystero-epileptic seizures, some authorities regard them as a mixture or combination of the two complaints,—a hybrid composed half of hysteria and half of epilepsy. According to another view, hysteria is the sole and original disease, and the convulsion, epileptic in form, only appears as an accessory element. This is the view which Charcot supports, on the following grounds: The epileptic type is never represented in the seizure fits, save in an imperfect manner; there is never any history of petit mal or of epileptic vertigo; and even when the attacks are frequently repeated, obnubilation of the intellect and dementia are never the consequences. Again, in rapidly succeeding fits of true epilepsy the temperature rises quickly to a high degree, accompanied with serious symptoms, and often followed by a fatal termination, whereas in hystero-epilepsy the temperature rarely exceeds the normal standard, and the general state of the patient is not of a kind to inspire uneasiness, even if the fits are very numerous and continue for several days.

It will be convenient in this connection also just to allude to certain curious nervous phenomena occasionally observed. 1. Catalepsy. In this condition the will seems to be cut off from certain muscles, and whatever position the affected part is placed in, for instance, a limb, it will remain fixed thus for an indefinite time. Catalepsy may or may not be accompanied with unconsciousness. Sensation is usually much impaired, and may be lost. This condition is sometimes associated with organic disease of the brain, or with serious organic visceral disease. 2. Trance. Here the individual lies as if dead, being ghastly pale, circulation and respiration having almost ceased. Persons in a trance have even been "laid out" as dead. 3. Ecstasy. The patient pretends to see visions. Often this is combined with ridiculous dancing movements, such as are practiced by certain religious communities.

Diagnosis.—Attention to the characters described as pertaining to a hysterical paroxysm, and the circumstances under which it arises, will usually enable it to be distinguished from epileptic and all other kinds of fits. In women hysteria should always be borne in mind as explaining many of the ailments of which they complain. Among the most important affections which it may simulate are diseases of the brain and spinal cord, diseases of the spinal column, peritonitis, abdominal tumors, laryngitis, and diseases of joints. The general signs of hysteria; the absence of pyrexia or of the characteristic symptoms belonging to the several affections; the peculiar superficial nature of any pain or tenderness present; the characters of the different kinds of paralysis, as already described; and the effects of the administration of chloroform, will in most cases enable a satisfactory conclusion to be arrived at.

Treatment. — 1. *Of a Hysterical Fit.*—But little interference is needed as a rule. An important matter is to get rid of the numerous officious and sympathizing individuals who generally surround the patient. She should be treated firmly but kindly, an endeavor being made to gain her confidence, first ascertaining, if possible, the cause of the fit. Care must be taken to prevent injury, and the clothes should be loosened about the neck and chest. If anything further is demanded, affusion of cold water over the face, the application of ammonia to the nostrils, or the plan of closing firmly the nostrils and mouth for an instant, so that the patient cannot breathe, may be resorted to. In obstinate cases a moderate galvanic shock does no harm. If any medicine is needed, spirits of ammonia with valerian or asafœtida may be given. Charcot has revived the treatment formerly adopted, of making firm pressure over the ovarian region to check hysterical fits, especially if they are of a severe type.

2. *Of the Hysterical State.*—The management of persistent and confirmed hysteria is often very difficult. Mental and moral guidance is most important, and the patient should be taught to look away from herself and her grievances, and to engage in some useful occupation. Any injurious habit must be rectified. Change of scene and associations, especially with traveling, is often very serviceable. Any cause of discomfort at home or elsewhere should be removed if possible. General treatment, directed to the state of the system and of the blood, is often most beneficial; attention being also paid to diet and to the state of the digestive organs. On no account should hysterical patients be encouraged to take alcoholic stimulants. Various symptoms often call for interference. Pains in different parts are best relieved by belladonna or opium plasters or liniments, that about the joints by warm poultices or fomentations sprinkled with laudanum. Hypodermic injection of morphia may be required. For restlessness and sleeplessness bromide of potassium is the best remedy. Paralysis must be treated by electricity, and rigidity counteracted by fixing the limbs in other positions by means of splints or other mechanical apparatus, and by passive movements. If necessary, chloroform may be used; this agent may also be employed to get rid of a "phantom tumor." I have often found aphonia to be cured by applying a small blister across the larynx, or even a strip of belladonna plaster, these probably acting by exerting a mental influence. In obstinate cases the vocal cords may be galvanized; or the patient may be charged with Franklinic electricity, and sparks then taken from over the larynx. It is questionable how far such drugs as asafœtida and valerian are useful in hysteria, when used as a means of cure, except in being very disagreeable; they are valuable, however, as antispasmodics.—FREDERICK T. ROBERTS.

HYSTERO-EPILEPSY—*See Hysteria.*

ICHTHYOSIS.—*Definition.*—Ichthyosis is a congenital hypertrophic disease of the skin, characterized by increased growth of the papillary layer with thickening of the true skin and the production of masses of epidermic scales.

Symptoms.—Some doubt exists whether ichthyosis is always a congenital disease. The characteristic appearance of the skin is sometimes not developed until some years after birth; it is, however, impossible to say that some abnormal condition or tendency did not exist at birth, although it may not have become apparent until a later period, and this view is supported by the fact that ichthyosis is hereditary.

There are many degrees of icthyosis, ranging from a mere roughness of the skin to a condition resembling that of the skin of the shark. In a case of average severity the growth of the papillary layer is greatly increased, and the whole skin thickened. The natural furrows of the skin are, as the result of this growth, much deepened, and the surface is mapped out into polygonal tracts, presenting an appearance similar to a crocodile's hide. Surmounting the ridges are collections of epidermic scales, which at first are limited in quantity, but as time progresses increase in size. Masses are formed in the centre of a patch, either thin and pearl-colored or of varying shades of color, from green to brown or black, and may also cover the enlarged papillæ, forming projections from the surface. There is a complete absence of perspiration from the parts attacked with the disease but the unaffected regions, such as the head, usually perspire freely.

Ichthyosis simplex, or xeroderma, is the form most frequently met with. It usually becomes apparent in the child at about two years of age, when it is nothing more than a general roughness of the skin, especially marked over the knees and elbows. At a later period the epidermis is shed in flakes and the general roughness is greatly increased, but certain regions, such as the inside of the extremities and the palms and soles, differ from healthy skin only slightly, while the face is dry and furfuraceous. With the exception of these regions the skin is covered with the irregular-shaped patches above described, limited by the natural folds of the skin. On the knees and elbows, on the fronts of the ankles and margins of the axillæ, and, indeed, on all parts exposed to friction, the masses become so thick and black from dirt that the disease is far more marked than on the other regions.

Icthyosis cornea occurs less frequently than the simple variety. It consists of a growth of hard, horny prominences, often standing out a quarter of an inch, which, being aggregated together, form patches somewhat resembling the condition found on the knees and elbows in ichthyosis simplex. They are believed to be due to an alteration of the lining of the sebaceous follicles into horny material. This first distends the follicle, and then passes through its orifice to the surface, where it protrudes. The exposed end is broken away, and with it a part of the material in the follicle, and a cup is thus left, which is again filled by further growth of the horny substance. When these are thrown off, the skin of the part is left in a normal condition.

Diagnosis.—With the exception of psoriasis there is no disease for which ichthyosis could be mistaken.

Prognosis.—Ichthyosis is a very intractable disease, but is never fatal. It can be somewhat benefited by remedies, but only temporarily. Occasionally, after a prolonged and severe general illness, the disease has been observed to disappear, and has not again returned.

Treatment.—Any local application likely to soften and remove the accumulated epidermis is the proper treatment, and for this purpose alkaline lotions, and soaps of various kinds, the one recommended by Hebra being composed of iodide of sulphur, oil, glycerin, have been tried. Absolute cleanliness is most essential, and the constant and prolonged soaking of the body in water will often lead to a diminution of the ichthyotic condition. Various internal remedies have been tried, but with no benefit.—MALCOLM MORRIS.

ICTERUS—*See Jaundice.*

IDIOCY, IMBECILITY.—An idiot is one who, in consequence of some cerebral abnormality originating before the brain has reached its full size, and the mind its full capacity, becomes irrecoverably deficient in mental power, and lacks the capacity to co-ordinate his brain functions.

Dr. Ireland defines idiocy as "mental deficiency, or extreme stupidity, depending upon mal-nutrition or disease of the nervous centres, occurring either before birth or before the evolution of the mental faculties in childhood."

Imbecility is generally applied to that condition in which the mental incapacity is less marked than it is in idiocy. When any distinction is made between the two conditions it is generally meant that the mental capacity of the imbecile is superior to that of the idiot. Idiocy is almost always congenital, imbecility rarely so; an idiot is not often so destructive as an imbecile, and the latter often "show an amount of moral sensibility and perception far beyond that which the idiot possesses, and out of all proportion to his intellectual capacity."

Brain abnormalities may be due to—

1. Arrest of develoment. } Both of which may be secondary to some
2. Arrest of growth. } disease.
3. Disease, e. g. chronic hæmorrhage into the meninges.

Mere backwardness must be distinguished from idiocy. This may be done by observing that there is no unusual size or shape of head; no fits, no paralysis, no spastic rigidity. M. Séguin ably describes the difference:—"The idiot," he says, "even in the slightest degree of the affection, presents an arrest of development both of body and mind; the backward child does remain stationary, but his development goes on more slowly than that of other children of his age; he is behind them in the whole course of their progress, and his delay, increasing every day, places, at length, an enormous distance between him and them, a distance which, in fact, is insurmountable."

An excessive development of some normal attribute, *e. g.*, obstinacy of firmness, must not be mistaken for idiocy. Such cases require tact and great forbearance in their management. The child should not be curbed and threatened, but led into a better frame of mind.

So, again, mere idleness and inertness are not idiocy; but there is some danger lest they become such, because the brain is not duly exercised.

There is sometimes observed a temporary deficiency from nervous exhaution and general debility, *e. g.*, on recovery after the acute specific diseases. This condition may last a long time, and though it is frequently eventually recovered from, yet we must give a guarded prognosis, as it sometimes ends in epilepsy and death. Cases are on record of insanity following hooping-cough, congestion of the brain, and ordinary intermittent fever, but they are, fortunately, extremely rare.

Chorea is apt to degenerate into idiocy when very long continued; the stupidity which often exists during an ordinary attack of chorea is recovered from.

The question often arises, how shall an opinion be formed as to the state of the child's brain before it can talk? &c. Attention to the following points will generally solve the difficulty.

1. The child's eye should follow a bright light or bright object in two weeks from birth; it should begin to smile about the same time. It should be remembered that squinting when objects are brought near them is natural and proper to children under one month old, but not afterwards; and because the child cannot at that age adjust its eyes it is no sign of cerebral disease.

2. A child should begin to use its hands and take hold at three months; to know familiar faces at three to four months; to know objects by name at eight to nine months.

The tongue should be kept within the mouth from the earliest age. The child should support its head at three months. Idiots always fail in this. The anterior fontanelle should close at from eighteen to twenty-four months.

3. A child should begin to talk at nine to sixteen months; to walk at ten to eighteen months; should feel its feet when held out to walk at nine months. Deviations from this rule may occur without indicating any mental deficiency, it being not unfrequent to find that children do not walk until nearly two, and frequently do not begin to talk till about the same time.

The child's brain shonld weigh at birth ¾lb., at the end of five years *1.5 lb.,; by the seventh year it* should have acquired its full size.

A small brain may be due to—

1. Deficient supply of blood.
2. Inflammation of the meninges.
3. Effusion of blood on the surface of the meninges in large quantities.

A large head may be due to—

1. Mere thickening of bone, as in idiocy and rickets. This is not a cause of idiocy, but secondary to it.
2. Pure hypertrophy. This does not cause idiocy, nor any symptoms until compression occurs.
3. Albuminosis of brain merely causes defective power, not idiocy.
4. Hydrocephalus often accompanied by idiocy.

Whenever there is idiocy, whatever the cause, there is often some bodily defect, *e.g.*, arrest of development, fits, heart disease, spastic rigidity, and shortening of some muscles.

Of all mental derangements idiocy is the most frequently propagated by descent; it may be congenital or acquired, though by far the larger number of cases are undoubtedly congenital. Out of 169 idiots, about whom Mr. Ludwig Dahl, of Christiania, had information, about 50 per cent. had insane relations; but out of 151 who had become insane, only 38 per cent. had relations affected in mind. Dr. J. Langdon Down has made inquiries into the causes of idiocy in 2000 cases, and found that in 45 per cent. there were well-marked neuroses in the families of one or both parents. If the neurosis were marked on the mother's side, the first children were the most affected. If on the father's side he found that it was the later born children who were affected.* Consanguine marriages are undoubtedly another cause of idiocy, more particularly if either parent come from a scrofulous, syphilitic, or intemperate stock. Scrofula itself is a fertile cause, and it is said two-thirds of all idiots are of a scrofulus constitution, as is evidenced by the frequency with which such diseases as suppurating glands, skin eruptions, ophthalmia, otorrhœa, and strumous ulcers, appear amongst them. It is said that fully two-thirds of all idiots die of phthisis. Among other causes may be mentioned congenital malformation of the brain; fright, after which, if severe, the brain sometimes discontinues its growth; injury to the brain by blow, fall, etc., convulsions, epilepsy, and not unfrequently, masturbation. Fright to the mother during pregnancy is often assigned as a cause of idiocy, and there seems no reason for denying that such influence during pregnancy may, in some cases, produce idiocy in a child of healthy parents, who would have otherwise have been born free from mental disease.

The chief characteristics of idiots may be summed up thus : The mind remains in an undeveloped state, except perhaps the development of mischievous propensities—hence he cannot walk or talk properly; he is often deaf, cannot take hold of objects, and is often deformed. The most common deformities are hernia, wad-shaped fingers, one or two toes of abnormal shortness in each foot, squinting, coloboma of the iris, strange shapes of the ears, and club foot. The head may be very much enlarged or unusually small, constituting hydrocephalic and microcephalic idiocy; the testicles are occasionally wanting; the hair on the pubes is generally scanty. In regard to speech and hearing, careful examination should be made of the ears, as cases have been known of children being supposed idiotic, who were merely suffering from a curable form of deafness. A common accompaniment of idiocy is what has been called a "vaulted palate;" the palate is narrow, the space between the molars and bicuspids of opposite sides being diminished, and the height of the palatal arch is at the same time increased at the expense of the cavity of the nares. In cases where the narrowness is extreme, the alveolar processes of the upper jaw are advanced, and the protruding teeth are left uncovered by the upper lip. Even when this condition is not present, there are almost always present in idiots, thick everted lips, the mouth large, often gaping; the teeth irregular and decayed; the gums swollen, and more or less constant dribbling of saliva from the mouth. In many cases there are alterations both in the size and structure of the heart; it being often small with deficient valves, and open foramen ovale. There are present evidences of weak circulation, shown by cold feet and hands; and it has been found that those who have these symptoms do not make the same progress in education and training as those whose extremities show a more healthy state of heart and circulation.

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* Vide *British Medical Journal*, October 11th, 1873.

An unpleasant odor is often exhaled from the skin of idiots; the habits are dirty; there is often obstinacy and brutality, the appetite is greedy, and the passions strong.

Cretinism is defined by Drs. Tuke and Bucknill as an arrested development of the nervous system and bodily organization generally, either before or after birth, due to a local cause, as the condition of the soil, water, air, &c., and marked by characters which distinguish it from a state of mere endemic idiocy. It is a disease which has been generally supposed to be confined to particular localities, as the Alps, Pyrenees, and Himalaya mountains; but further research has shown that it occurs in a larger geographical area than the above-mentioned parts; it is found, generally speaking, most commonly in shut up valleys, where the soil is damp, the air foul, and the inhabitants dirty, poor and often improperly and insufficiently fed. Cretinism is generally, though not necessarily, associated with goitre; it appears that the cause which, when it is feeble, produces goitre alone, produces cretinism when it acts in greater intensity.

The definite causes of cretinism are unknown, but it is usually attributed to a humid or vitiated atmosphere, owing generally to being situated between high mountains, imperfectly constructed and badly ventilated dwellings, leading in most cases to bad drainage and deficient light; and, lastly, imperfect quantity and quality of food and water. Water derived from calcareous sources, notably alpine and limestone, has been accredited with a full share in the causation.

Symptoms.—Whether or no cretinism can be recognized at birth is a matter of some uncertainty; but it may be stated with tolerable certainty that we may in many cases, by combination of symptoms, be able to foretell that a child will become cretinous. The symptoms usually commence to show themselves in a marked manner about the sixth month. Children then, according to the authors of the Sardinian Report,* present the following symptoms: The growth of the body makes very little progress; at other times, though apparently in good health, they are fat, puffed out and weak. The color of the skin is sometimes brown, sometimes of an ashy yellow. The head is constantly big; the fontanelles are widely open; sometimes all the sutures disjointed as if by hydrocephalus. They seem to open their eyes with reluctance; they look languid and stupid; their physiognomy remains always the same, unchanged by fear, joy, or impatience. They eat a great deal, and with eagerness; they pass the rest of their time in sleeping, and are not easily awakened. Their lips are thick and swollen, and generally remain gaping. Their nose is broad and short. They seldom weep, and their cry has something hollow and peculiar about it. The belly is swollen, and gives a dull sound to percussion. The limbs are generally small and feeble, but sometimes quite normal. The neck is large and thick, in many cases deformed with goitre. In place of the growing intelligence of childhood, the cretin is dull and apathetic. As he gets older, the general slowness of his growth becomes more manifest. Teething, which always commences later, usually goes on for several years longer, and is often accompanied by an unpleasing salivation, and not unfrequently with alarming eclamptic fits. The teeth are generally irregular, frequently blacken, decay and fall out, often never to be renewed. The cretin can seldom hold himself upright before the second or third year, and cannot generally walk before the sixth or seventh. Speech commonly comes later than walking. The character of the face undergoes very little change after puberty, *i. e.*, a cretin of fifteen or sixteen years of age presents much the appearance of a man or woman of fifty or sixty.

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* "*Report of a Commission* appointed by Charles Albert, King of Sardinia, to investigate *the Causes, Nature and Treatment* of Cretinism," 1850.

The difference between cretins and idiots may be stated as follows:

1. An idiot is born with his deficient development, the malady is congenital and organic. The cretin, on the contrary, may for some time appear free from disease, and, if placed under favorable circumstances, might escape altogether.

2. Cretinism is endemic; idiocy is not so, but appears without any particular regard to locality. From this point of view, its toxic origin is its distinguishing characteristic.

3. The brown or yellow color of the skin, the high and arched palate, the considerable number of cases in which the thyroid is enlarged, present points of contrast with ordinary idiocy, though the vaulted palate sometimes exist in idiots.

4. Cretinism is more curable than idiocy.

5. A marked distinction exists in the greater degree in which, in cretinism, the muscular and nervous systems are affected. In idiocy there may be great deficiency of the mental functions without anything like the same amount of loss of muscular power and co-ordination.

Treatment.—Much may be effected even in the education and training of idiots; in fact, it is surprising how wonderfully, under those who have the necessary patience, long suffering, and experience, the poor idiot will develop into a being with some intelligence, and with trained and disciplined habits. This is not the place to enter into any details in the matter; it is sufficient to say that even congenital cases are not to be abandoned as hopeless, and to refer those who would see and know more to the excellent establishment at Earlswood, Redhill.

In the treatment of cretins, Dr. Guggenbuhl, the Director of the Institution for Cretins at Abendburg, recommends, first, pure mountain air, milk in abundance, cold and shower baths, with frictions of the skin with dry flannels, as well as spirituous and aromatic fluids to act upon the cold, flabby, and wrinkled skin of the cretin. He does not advise the use of iodine internally, as tending to increase atrophy, but recommends syrup of iodide of iron, carbonate of iron, and cod-liver oil in cases of great muscular weakness. He also speaks of the use of salts of copper and zinc, of the latter the oxide and valerianate; of magneto-electric currents, where there was much wasting of limbs, and advises great attention to cleanliness, and proper gymnastic exercises to bring into play as many muscles as possible.—E. Ellis.

IMPETIGO.—It is nearly allied to eczema, and eruptions are common which are intermediate between the two. But impetigo is a pustular, not a vesicular disease, and forms thick crusts and scabs.

Causes.—Chronic irritation; for instance, "grocer's itch," an impetigo of the hands, is caused by constant contact with sugar. Dirt, lice, contagion syphilis.

Situation.—Usually head, hands, or face. Pustules usually correspond to hair-follicles. Syphilitic impetigo accurs in large patches.

Treatment.—Poultice to remove scabs. Ung. zinci; hydrarg. ammon; ung. sulphuris, and mixtures of these ointments. Treat general health, and syphilis if present. Sulphur baths.

IMPETIGO CONTAGIOSA—*See Porrigo.*

IMPOTENCE.—Incapacity for sexual intercourse. Note the difference between this definition and that of sterility. Impotence occurs in women as well as men. Causes.—1. Orignal malformation of copulatory organs; marked epispadias or hypospadias, absence or occlusion of vagina and double vagina. 2. Accidental deformity of copulatory organs; amputation of whole penis; occlusion or obliteration of vagina by cicatricial contraction. 3. Organic affections of the less superficial genito-urinary organs; spermatorrhœa; varicocele; castration. 4. Nervous influences. The condition called "irritability with weakness" usually depends on both third and fourth class of causes. When impotence is not the effect of visible malformation, it almost always is the result of masturbation, very rarely of sexual excess. Masturbation usually leads, in the first place, to "irritability with weakness." Here ejaculation takes place before entrance is effected, or else erection is impossible, and, consequently, copulation impossible. This condition is not always the result of masturbation. Disgust for the female, or the fear of sin or of contagious disorders; doubtless causes it in some cases. *Signs and Prognosis.*—Some are given in the preceding paragraphs. Sometimes the genitals are flabby, cold and small, If, in such cases, erections never occur, not even in bed in the morning, the prognosis is not very good. But so long as erections occur at all, the prognosis is very hopeful. *Treatment.*—Four principles: 1. Strengthen general health; fresh air, sleep, moderation in all things, in exercise, in diet, and in mental work; 2. avoid all unnatural excitement of genital organs; 3. treat any physical defect whith can be found. If there is the slightest sign of varicocele or relaxation of scrotum, give patient a suspensory bandage; 4. to complete the cure—at all events, to demonstrate the cure to the patient—requires the moderate and regular practice of sexual intercourse for a short time. Of course, it is right that this should be done in the marriage state. Paget writes: "Some will expect you to prescribe fornication. I would just as soon prescribe theft or lying, or anything else that God had forbidden. Celibacy does no harm to mind or body; its discipline is excellent; marriage can be safely waited for." If the patient is already married, attend to the first three indications, give some mysterious and harmless medicine, and forbid intercourse for three weeks. "The nonchalance that he thus acquires during sexual excitement, and inattention to the strength and duration of the erections, render cohabitation possible, and he has the first successful coitus during the time it was forbidden." Lallemand's porte caustique. A solution of argent. nit. (gr. v. to ℥ j) is applied to prostatic part of urethra every other day. This is a treatment now unjustly neglected. Faradization of inner surface of thigh, of testicles, and lower part of spine. Constant current to spine. "Positive pole over 5th dorsal vertebra, negative over sacrum or perineum. Three or four sittings a week, one to three minutes each." Battery, 20 to 30 Daniel's elements of medium size.—C. B. KEETLEY.

INFANTILE PARALYSIS—*See Paralysis, Infantile.*

INFLAMMATION.—*Definition.*—When a structure is attacked with inflammation, there is active hyperæmia of the part itself, accumulation of leucocytes outside its blood-vessels, and a disturbance of its nutrition. In the case of a non-vascular part, the hyperæmia is in its immediate neighborhood, and, perhaps, the increase of corpuscles is due to division of the proper corpuscles of the part. So far there is nothing in the above definition to distinguish inflammation from the process of repair. And there can be no doubt that the word "inflammation" is constantly used to name action which is identical with the process of repair, *e. g.*, in the case of most slight localized "inflammations" terminating in what is called "adhesion." Inflammation is usually defined from "repair" by saying that it is "an excess of action." This definition appears to be scarcely satisfactory. When the surgeon says that a wound is inflamed, in ninety-nine cases out of a hundred, if not in the whole hundred cases, the state of things is probably this:—Processes identical with those necessary to "repair" have begun around the lymph capillaries near the wound; whereas the action ought to have been confined to the actual base and borders of the wound itself. The term inflammation, as commonly used in surgery, thus does sometimes mean an excess of action; and sometimes means action which it would be absurd to call excessive; as, for instance, in the very localized "inflammation" which so often prevents extravasation of fæces through a wound of intestine. In the latter case the phenomena of "inflammation" cannot be shown to differ from "repair." In the former they differ in this respect, namely, that the processes have spread from the region where they might have been useful to the vessels round the neighboring lymphatics, where they are worse than useless.

Caution.—I do not recommend the student under examination to trouble himself about the immediately foregoing remarks. He will find most safety in merely speaking of inflammation as "a perverted vital action" or "modified nutrition," and then plunging instantly into a description of its observed phenomena, &c.

Causes.—A. Predisposing; 1, plethora, especially if coincident with a weak circulation; 2, local congestion; 3, impurity of the blood, such as arises from kidney or lung disease; 4, alcoholism; 5, chronic inanition (does this cause inflammation or only modify it in an evil manner?); 6, atheromatous arteries; 7, defective innervation; 8, bodily state left after certain zymotic diseases, *e. g.*, measles and typhoid; 9, specific "diatheses," *e. g*, gouty, strumous, and rheumatic; 10, congenital peculiarities. The above list could be amplified *ad infinitum* by going into detail, *e. g.*, Cause 2 includes all the causes of œdema and dropsy, varicose veins, pressure of tumors on veins, &c., &c. B. Exciting causes: 1, physical; 2, chemical. Both these may be either of external or internal origin, *e. g.*, a joint may inflame from the physical irritation of a contusion, or of a loose cartilage, or from the chemical irritation of an iodine injection or of gouty products. The common practice, of classing quite separately the morbid products of the body itself, is illogical; for these products act either physically or chemically; 3, injuries or diseases of nerves; 4, specific influences. Physical causes include blows, wounds, strangulation, &c.; chemical include effects of strong acids and alkalies, and of septic material. An example of inflammation following nerve-injury is that of the eye-ball which follows injury of the ophthalmic nerve. Specific influences are such as syphilis, small-pox, and measles. The action of heat and cold are partly chemical and partly physical.

Phenomena.—Classical signs,—pain, heat, redness, swelling. *Pain.*—results from either tension or compression of nerve-fibrils. Its character and intensity vary with the locality. Osteitis causes aching, phlegmonous erysipelas causes throbbing pain, and superficial inflammations produce burning, tingling pains. With pain is associated tenderness. In the nerves of special sense, special sensation takes the place of pain, *e. g.*, tinnitus aurium in catarrh of the tympanum, while the intolerance of light in ophthalmia is analogous to tenderness. Pain is often diffused, *e. g.* pain throughout one side of face and head in toothache; or reflected, *e. g.*, pain in knee from hip-disease. *Heat.*—Inflamed parts, except in very chronic cases, feel sensibly hotter than normal. According to Mr. Simon and Dr. Montgomery, the blood leaves the inflamed part hotter than it enters it, and the inflamed part is hotter than either the blood which flows into it or the blood which flows out of it. Continental observations on this question have been numerous and conflicting. The subject of rise of general bodily temperature is noticed under the head of Fever. *Redness.*—Due to hyperæmia. Bright when there is active fluxion of blood to the capillaries of the part, as is usual in acute inflammations; dull, perhaps blue or brownish red, when the congestion is more passive, as is usual in acute inflammations. When a non-vascular part inflames, the redness is observed in the neighboring vascular region from which the inflamed part derives its nutrition. *Swelling.*—Partly due to congestion, partly to effusion. Effusion resembles in character liquor sanguinis, but it contains excess of chloride of sodium and of phosphates. It also contains leucocytes and even red blood-corpuscles. As a consequence of excess of chloride of sodium in the effusion, there is a deficiency of that salt in the urine. The characters of the effusion differ in different inflammations; especially variable is the amount of fibrine.

Pathology.—Microscopic observation of an inflamed part, *e. g.*, the web of a frog's foot which has been exposed to irritation, shows appearances which may be described under three heads, viz.: 1, disorder of circulation; 2, exudation; 3, stasis. After describing these, I shall consider the structural changes which take place in the constituents of the inflamed part. 1. *Disorder of Circulation.*—Dilatation of the arteries is the first phenomenon observed in an inflamed region. It is ordinarily preceded by no antecedent contraction. It increases gradually for ten or twelve hours, and remains at its maximum for many hours. Dilatation of the veins follows at a long interval of time. The rate of circulation at the commencement is increased, but this soon changes to the very reverse, viz., abnormal slowness. The cause of the vascular dilatation is undetermined, but a very reasonable hypothesis attributes it to inhibitory nervous influence. Billroth thus states this view: "We actually know such phenomena from physiology; the obstruction of the heart's action by irritation of the vagus nerve, of the movements of the intestines from irritation of the splanchnic nerve, &c. Here a vaso-motor nerve-system is supposed which arrests the contraction of the muscles; could not such a vaso-motor nerve-system also be supposed for the vessels—nerves, irritation of which lessens the tone of the muscles of the vessels and thus renders the walls less capable of resisting the pressure of blood?" That local nerves have an unquestionable influence over the circulation in inflamed parts has been experimentally proved.—See Holmes's *System*, vol. v., p. 735–6–7 8. Ammonia when used as an irritant to excite inflammation has this exceptional property—it excites a preliminary arterial contraction before the ordinary vascular dilatation. 2. Exudation.—As soon as the rate of circulation begins to slacken, white blood-corpuscles or leucocytes begin to accumulate and loiter along the side of the minute veins and the capillaries. "In this way the vein becomes lined with a continuous pavement of these bodies, which remain almost motionless, notwithstanding that the axial current sweeps by them as continuously as before, though with abated velocity. Now is the moment at which the eye must be fixed on the outer contour of the vessel, from which (to quote Professor Cohnheim's words), here and there minute colorless button shaped elevations spring, just as if they were produced by budding out of the wall of the vessel itself. The buds increase gradually and slowly in size, until each assumes the form of a hemispherical projection, of width corresponding to that of a leucocyte. Eventually the hemisphere is converted into a pear-shaped body, the stalk end of which is still attached to the surface of the vein while the round part projects freely. Gradually the little mass of protoplasm removes itself further and further away, and, as it does so, begins to shoot out delicate prongs of transparent protoplasm from its surface, in no wise differing in their aspect from the slender thread by which it is still moored to the vessel. Finally the thread is severed and the process is complete. The observer has before him an emigrant leucocyte."—Burdon-Sanderson. But although all the leucocytes observed outside the vessels in the earlier stages of inflammation have probably escaped from the vessels, there is still reason to believe that later accumulations of them are partially due to proliferation of the extra-vascular corpuscles. 3. Stasis.—The phenomena of stasis occur at an uncertain time during the course of inflammation, but they are not, as is sometimes stated, the first in order of occurrence. They are twofold: firstly the blood-current stops altogether, after getting gradually slower and then oscillating ; secondly, the colored corpuscles cohere to one another, and adhere to the sides of the vessels till they form an accumulation so dense that the capillaries seem to contain no liquor sanguinis, but only corpuscles. As similar occurrences take place even when milk is substituted for blood, and as the blood drawn in inflammation shows no special arrangement of its corpuscles,it is assumed that the phenomena of stasis are due to a changed condition of the walls of the blood-vessels.*

Structural changes which take place in constituents of inflamed tissues.—In non-vascular tissues, such as that of the cornea and of cartilage, the proper cornea and cartilage corpuscles proliferate. But numbers of leucocytes migrate from the vessels around the cornea into its substance. In cartilage the cartilage-cells multiply by division, and then cause the absorption of the stroma in which they lie. In tendon and in muscle similar changes have been observed. In the case of parts lined with epithelium, such as mucous and serous membranes and glands, it is probable that the greater part of the corpuscles of the inflammatory new formation are escaped leucocytes; but at least in the case of epithelial membranes, proliferation of epithelium appears to have been observed.

Further changes are described under headings noticed in the following paragraph.

Terminations of Inflammation—1, resolution; 2, adhesion or organization; 3 suppuration, including abscess; 4, ulceration; 5, gangrene or mortification. These processes are described respectively under the following heads: 1, 2, and 3, Wounds, Repair of; 3, Abscess; 4, Ulceration; 5, Gangrene,

Treatment of Inflammation.—Consider it under heads—A, indications B, remedial agents ; C, differences according to whether a case is acute or chronic, A. Indications.—1, to remove all sources of irritation and all predisposing causes: 2, to lessen local action; 3, to guard against or treat promptly all complications, or evil consequences; 4, to support the patient's strength during prolonged and exhausting cases; 5, to relieve pain. B. Remedial agents. They are either local or general. Local agents—Rest, cold, blood-letting, pressure, ligature or compression of artery supplying inflamed part, incisions, antisepsis, warmth with moisture, astringent and stimulating drugs, counter-irritation ; and certain other agents which will be noticed in considering the treatment of chronic inflammation. Constitutional agents are; rest, blood-letting, dieting, stimulation, drugs, mercury, antimony, aconite, belladonna, purgatives, diuretics, colchicum, iodide of potassium, quinine, opium, other anodynes; diaphoresis; "spinal" ice-bags.

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* If the vascular walls permit of the liquor sanguinis to leak through them, the speed of that which remains in the vessel will be slowed. It is easy to see how retardation of the current of liquor sanguinis would allow leucocytes to accumulate, because of the absence of the normal force which ordinarily washes them along the blood-vessels.—See St. *Bart. Hosp. Rep.* 1878, p. 299,

Some of the agents in the above list overlap one another, *e. g.*, "diaphoresis" partly includes "antimony;" but it is impossible to devise a satisfactory list without this fault.

Rest.—Bed, splints, slings, cradles, bandages (starch, plaster of Paris, paraffine, glue, gum, silicate of potash). Position: elevation. Flexion or extension: See Joint Diseases and Fractures. *Cold.*—Ice-bags, bags through which a continuous stream of cold water can be made to pass, irrigation, cold douche, wet-packing, evaporating lotions. Excessive cold with wet involves danger of frost-bite. *Local blood-letting.*—Leeches, cupping, dry cupping,* incisions, scarification, punctures, local venesection (*i. e.*, pricking veins near inflamed part). *Pressure.*—Bandages with subjacent layer of cotton wool, elastic bandage, pressure regulated by means of india-rubber bags containing water,† shot-bags. Ligature, compression or acupressure of artery of inflamed part or main artery of limb. Neudorfer says eight minutes of pressure, three or four times a day, suffice. *Incisions.*—Though mentioned above in connection with local blood-letting, are yet more frequently used to relieve tension. Extent and depth vary; usually they are about one and a half inches long by one and a quarter inches deep. Avoid vessels and nerves any size. Cut in axis of limb. *Antiseptics.*—See *Antiseptic Treatment* and *Wounds*. Warmth with moisture; poultices, fomentations, water-dressing, spongiopiline. Astringent and stimulating drugs: Extract of belladonna and glycerine, equal parts; silver nitrate, tannic acid, and all the various, astringent, stimulant, caustic and sedative drugs used in cutaneous and throat medicine. Counter-irritation: Vesicants, caustics, cautery, moxa, issues, setons, friction, shampooing, poultices.

Constitutional agents.—General blood-letting. Indications for: Severe inflammations of the contents of the head or thorax, following comparatively slight injuries, and attended with a frequent, full and hard pulse. The bleeding should be full and free from a large vein (*e.g.*, median-basilic), but not pushed to fainting. Repeat if necessary, and if immediate result of first bleeding be encouraging. Amount usually about ten ounces. Diet: Abstinence from food. Low diet. Former may be prescribed for a day or two in some cases of abdominal injury or inflammation. Low diet almost always beneficial. Stimulation: Full diet; extra nourishment. For cases of low type, when the general weakness seems more threatening than the local inflammation. Drugs: Mercury, antimony, aconite, belladonna, purgatives, diuretics, colchicum, iodide of potassium, quinine, opium, other anodynes. See some book on therapeutics, and the notices of inflammations of special parts or of specific origin in this book. Aconite very valuable. Diaphoresis: Effected either by drugs (antimony, Dover's powder), or by hot-air baths, blankets, or other physical agents. Spinal ice-bag, spinal hot-water bag. According to Dr. Chapman, former, by partially paralyzing vaso-motor system, increases the flow of blood to that part of the body which corresponds to the region of the spine to which the ice-bag is applied, *e. g.*, pelvic organs become actively congested and feet warm when ice-bag is applied to lower part of the spine. On the other hand, the hot-water spinal bag has an action the very reverse of this; hence the ice-bag can be used to obtain a derivative action, and the hot-water bag to directly contract the arterioles of an inflamed part.

C. *Differences in treatment, according to whether the inflammation is acute or chronic.*—In acute cases the indications are usually to save life, to check the attack before serious local mischief has been effected, to prevent the spread of a localized inflammation, and to relieve pain. In treating chronic cases the surgeon has rather to attempt the removal of what may be termed pathological habits and their evil effects. In acute cases he employs such active agents as venesection, free leeching, and the administration of drugs which powerfully affect the nervous and vascular systems (*e. g.*, opium and aconite). In chronic cases resort is had to pressure, friction, counter-irritation, and stimulant or astringent drugs locally (*e. g.*, silver nitrate), with "alteratives" internally (*e. g.*, mercury, iodide of potassium, sarsaparilla). It is especially in many chronic cases that a tonic and generous plan of treatment has to be adopted. In dealing with chronic inflammations, always seek for some long-lasting cause, or for some specific influence (*e. g.*, syphilis, struma, rheumatism).—C. B. KEETLEY.

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* *Of course dry-cupping is not really* blood-letting, but its action is similar.

† *See Lancet, November, 1878.*

INFLUENZA.—Influenza is essentially an epidemic disease, and usually attacks a large number of persons, either simultaneously or in rapid succession. It often breaks out in several parts of a district at the same time. The epidemic generally progresses in a certain direction, and is said to have a cyclical course; frequently, however, it prevails over a very large area. The inhabitants of large towns are chiefly affected, especially of those parts which are low, damp, overcrowded, and in other unfavorable hygienic conditions. Sometimes the disease breaks out even at sea. It is very prone to modify the characters of other affections.

The exciting cause of influenza is believed to be a specific poison, which is conveyed only by the atmosphere. The nature of this poison is quite unknown. Most authorities regard the complaint as being infectious; others consider it to be of malarial origin and non-infectious. Inoculation cannot be effected in any way. Various hypotheses have been advanced to explain the occurrence of epidemics, but none of them are at all satisfactory. They break out at all seasons, but sudden changes of temperature are said to favor the development of the disease.

The chief individual predisposing causes are the female sex slightly, adult and advanced age, a low condition of the system, exposure to cold, and, it is said, the existence of chronic lung and heart diseases. The presence of any acute disease is believed to afford protection against influenza. One attack does not prevent another, and it has even been stated to render the individual more susceptible.

Anatomical Characters.—The usual morbid appearances in influenza are those of catarrh of the mucous membrane lining the nose and its communicating sinuses, the mouth, throat, and respiratory tract, and of the conjunctivæ. In severe cases capillary bronchitis, pulmonary congestion and œdema, or pneumonia may supervene, the inflammation often involving both lungs. Sometimes the lining membrane of the entire alimentary canal and that of the genito-urinary apparatus are affected. Occasionally pleurisy or pericarditis supervenes, or very rarely meningitis. There is no splenic enlargement.

Symptoms.—Influenza is a disease running a specific and definite course, and characterized by pyrexia, with much constitutional disturbance, and local symptoms due to the implication of the mucous membranes indicated above. The period of incubation generally lasts from a few hours to five or six days, but may extend to two or three weeks.

The general symptoms usually precede the local, but not always. The invasion is often markedly sudden, but in other cases it is gradual. The early symptoms are chilliness, lassitude, pains in the limbs, and in some cases intense headache or nausea and vomiting, followed by fever, which is usually high, the skin being very hot and dry, though sometimes there is much sour perspiration. At the same time the patient complains of a feeling of great prostration and debility, apathy, lowness of spirits, and mental inaptitude, with severe aching and shooting pains about the chest, back, limbs, and neck, headache, giddiness, and general restlessness. The pulse is at first frequent, full, and bounding, but soon tends to become soft, weak, and slow. The urine is febrile. The pyrexia generally present, evening exacerbations, and it is said to be in some districts intermittent. In uncomplicated cases the duration of the fever usually varies from four to eight days, being frequently terminated by crisis, accompanied with copious perspiration, a free flow of urine depositing lithates or diarrhœa; but in other cases the pyrexia subsides gradually.

The local symptoms vary according to the seat and extent of the catarrh. Usually this begins in the nose and conjunctivæ, and spreads downwards. The nasal cavities feel hot and dry at first, and the eyelids smart. Soon a watery acrid discharge flows abundantly, and there is much sneezing, the sense of smell being impaired or lost; occasionally profuse epistaxis occurs. The mouth, tongue, and throat feel sore, and taste is defective. Severe pain is experienced across the forehead, owing to implication of the frontal sinuses. These may be pain along the Eustachian tube, with noises in the ears and some degree of deafness. Examination reveals redness of those membranes which are visible, while herpes is often seen about the lips. The symptoms indicating implication of the air-passages are hoarseness; soreness, and a tickling sensation along the larynx and trachea; more or less dyspnœa; oppression and stiffness across the chest; paroxysmal cough, at first dry, but afterwards attended with bronchitic expectoration. These catarrhal symptoms usually subside from the fifth to the seventh day, the materials discharged undergoing the ordinary changes observed in the course of a catarrh. The tongue is furred, and there is much thirst, with loss of appetite. Gastro-enteric catarrh is evidenced by epigastric pain and tenderness, redness of the tongue, nausea or vomiting, and diarrhœa.

Cases of influenza differ much in their severity, and not unfrequently dangerous pulmonary complications arise, especially capillary bronchitis and pneumonia. The latter is apt to come on very insidiously, without any prominent symptoms. In these and other cases there is sometimes a tendency to adynamia, the tongue becoming brown and dry. Nervous symptoms are also occasionally prominent, namely, delirium, stupor, and convulsions.

Duration and Terminations.—Uncomplicated cases of influenza generally begin to convalesce from the fifth to the tenth day, but the duration may be much prolonged by complications. The great majority of cases end in recovery, but convalescence is often very tedious, and sequelæ are apt to remain, viz., great debility, with nervous depression; neuralgic and rheumatic pains, which are common about the head and neck; or persistent cough. Occasionally chronic bronchitis, emphysema, chronic laryngitis, or phthisis is set up. Death is usually the result of lung complications, but sometimes follows adynamic symptoms.

Prognosis.—The circumstances which render an attack of influenza grave are very early or advanced age; a feeble constitution; the presence of chronic pulmonary or cardiac disease; serious lung complications, with great dyspnœa, inability to expectorate, and signs of imperfect blood-aeration; nervous disturbance; evidence of weak circulation; or adynamic symptoms. Some epidemics are much more fatal than others.

Treatment.—It has been satisfactorily proved that lowering treatment is injurious in influenza. In all cases it is advisable to keep the patient indoors, in a cool, well-ventilated room, but protected from draughts. At the outset a purgative is useful, and in adults a dose of calomel seems to be beneficial, but repeated purgation is decidedly to be deprecated. Some recommend an emetic at the commencement, but such treatment is only indicated if there is much nausea. The diet must depend on the nature of the case: if it is slight, a moderate quantity of beef tea and milk may be allowed; but in severe cases attended with much depression, a considerable amount of liquid nourishment is required. It is found to be preferable to give things cool, and cooled or iced drinks are very grateful, and may be freely allowed. Dr. Parkes recommended a highly diluted solution of nitrate of potash with lemon juice and sugar. Alcoholic stimulants are not required at first, unless there is much debility, except in old persons, who generally need them early; in some instances large quantities of wine or brandy are called for, but they must be used cautiously. Quinine is a remedy which is usually well borne, and does much good; it is most valuable towards the decline of the disease, but may be given from the commencement.

The catarrhal symptoms are best relieved by inhalations of steam, to which some add ether, chloroform, or conium. Dr. Parkes suggested that direct local applications to the nasal mucous membrane and throat might be useful. For the bronchial catarrh vinum ipecac. in full doses answers best, and it may be combined with some sedative, such as henbane or conium, care being taken that there is no accumlation of secretion. Opium should only be employed with particular caution. Poultices, sinapisms, and warm or anodyne fomentations to the chest are often valuable. Should capillary bronchitis or pneumonia supervene, stimulant treatment is decidedly indicated, ammonia with decoction of bark and chloric ether, camphor, or other remedies of this class being administered, as well as alcoholic stimulants. Free dry-cupping is often valuable in these cases. The patient must be encouraged to cough should there be extensive bronchitis, in order to get rid of the secretion, and if this accumulates an emetic must be given.

If the general pains are severe iodide of potassium with quinine often gives relief. It may be necessary to administer opium, or to have recourse to subcutaneous injection of morphia. Some practitioners recommend the administration of colchicum. Pyrexia may be moderated by cold sponging. Cold to the head, or the application of two or three leeches might be necessary should dangerous nervous symptoms arise.

During convalescence tonics are needed, especially quinine and iron, with nourishing food and wine or beer. Change of air is highly beneficial, and the patient must wear flannel, and guard against taking cold. Expectorant remedies are often required at this time, and excessive cough must be allayed by opiates.—FREDERICK T. ROBERTS.

INSECTS, STINGS OF—*See Bees, Stings of.*

INSOLATION—*See Sunstroke.*

INTESTINAL OBSTRUCTION.—*Causes.* 1, Intussusception; 2, strangulation by bands or by congenital diverticula; 3, volvulus or twisting; 4, internal hernia; 5, strictures—malignant, cicatricial, or simple; 6, pressure of tumors or dragging of the bowel out of place; 7, impaction of fæces or of foreign bodies; 8, pouching of intestine; 9, intestinal paralysis. According to Pollock, of 135 cases, 24 arose from intussusception, 36 from bands, diverticula and the like, 33 from intrinsic stricture, 8 from internal hernia, 7 from concretions, calculi, and foreign bodies, 4 from volvulus of sigmoid flexure, 3 from fæcal accumulations, 9 from peritoneal adhesions, tubercle, etc.; and 8 were doubtful.

Pathology.—Intussusception. Portion of intestine, usually lower end of ileum, becomes invaginated in the portion immediately below it. If the case proceeds, the further invagination takes place chiefly at the expense of the lower, that is the containing part of the bowel; *e. g.*, an intussusception commencing at the lower part of the small intestine will gradually absorb cæcum, ascending colon, &c., until the cæcum appear even out of the anus. Of course a section of an intussusception would show three concentric cylinders, of which the inmost and middle present serous surfaces towards each other, while the middle and outmost touch each other on their mucous surfaces. Between the inmost and middle cylinders is the mesentery, tapering to a point at the lower end of the involution and causing an arching of the involuted part of the intestine towards its mesenteric border. The orifice at the lower end of the central cylinder, namely that which opens into the bowel below the disease, is a slit and not circular. Peritonitis and adhesions usually occur, though often not till very bloody stools. The natural process of cure is for the involuted intestine to inflame, become strangulated, slough, and come away per anum. 2, Strangulation by glands or by congenital diverticula. Bands are usually adhesions of inflammatory origin; they are often attached to diverticula. Diverticula are mostly found at the lower end of the ileum. They originate either from a partial persistence of the omphalo-mesenteric duct or from a hernia of the mucous coat of the bowel. 3, Volvulus; three varieties; 1st, when bowel is rotated on its own axis, only occurs in ascending colon; 2nd, when mesentery forms the axis and is twisted into a cone, only occurs in small intestine; 3rd, when one coil of intestine forms the axis round which another coil is bent. Most volvuli occur in sigmoid flexure. Loose flabby mesentery usually found in these cases. 4, Internal herniæ. See Hernia. 5, Strictures. Almost all occur in large intestine. Causes: cicatrices of tuberculous or of dysenteric ulcers, or of ulcers caused by irritation of foreign bodies; inflammatory effusion and contraction in the substance of the intestinal wall; cancer. The last cause is the most common. The pathology of the remaining causes of intestinal obstruction need not be considered in detail here.

Signs.—Vomiting, constipation, abdominal pain; constitutional depression; there are modified and special symptoms added according to prime cause.

Diagnosis.—1st, from other diseases causing vomiting, constipation, and pain; 2nd, of the particular nature of a given case of obstruction. 1st, bear in mind possibility that the symptoms are caused by peritonitis, perityphlitis, passage of a gall-stone, impaction of a calculus in the ureter. Abstract of Mr. J. Hutchinson's memoranda for diagnosis. 1, If patient be a child, and the onset of symptoms be sudden—probably intussusception or peritonitis. 2, If an elderly person—impaction of fæces, or else malignant disease (stricture or tumor). 3, Middle age—intussusception and malignant disease very unusual. 4, Intussusception causes frequent straining, passage of blood and mucus, incompleteness of constipation, discovery of a sausage-like tumor either per anum or through abdominal walls. 5, Also in intussusception, parietes usually lax, and therefore it is almost always possible to feel the sausage-like tumor by manipulation under ether. 6, Malignant stricture. Old person, continued abdominal uneasiness, repeated attacks of temporary constipation. Constipation often not complete. 7, Tumor should be discoverable either through parietes or else per anum or per vaginam. Beware of confounding with scybalous masses. (Latter may probably be indented or pressed into different shape). 8. If there have been repeated attacks of dangerous obstruction with long intervals of perfect health, suspect diverticula, or bands, or pouching with liability to twist (volvulus). 9, Abdomen hard and distended from near commencement of case, peritonitis almost certainly. 10, Intestines visibly rolling about. Almost certainly no peritonitis. 11, The tendency to vomit is in proportion to (1) nearness of impediment to stomach, (2) tightness of constriction, (3) persistence with which food and medicine have been given by the mouth. 12, Vomiting often absent in cases of obstruction in the colon or rectum. 13. Violent retching and bile-vomiting often more troublesome in cases of gall-stones or renal calculus simulating obstruction than in true conditions of the latter. 14, Fæcal vomiting can occur only when the obstruction is moderately low down. When happening early in the case, it is very serious, as it implies tightness of constriction. 15, Hand in rectum may obtain useful information.

Treatment. — First question is that of gastrotomy. Indications for gastrotomy are a tolerably clear diagnosis of intussusception, strangulation by band, volvulus, or internal hernia. Of course in many of these cases other means should have been fairly tried before resorting to abdominal section. It is to be remembered on the one hand that most operations of the kind have been fatal, while many cases presenting bad symptoms have recovered spontaneously; on the other hand there are cases in which hope of spontaneous recovery is out of the question. Antiseptic precautions will diminish the risk. In cases of incurable stricture, an artificial anus must be formed. Vide Colotomy. When exact seat of disease is doubtful, operate in right loin. If upper part of large intestine be found empty, bring a coil of small intestine into wound. In certain cases of insuperable obstruction, in which the seat of disease is believed to be above the cæcum, small intestine may be opened through anterior abdominal wall.

Measures not involving cutting operations.—In all early stages and in all acute cases, abstain entirely from giving either food or medicine by the mouth. Make a careful examination under ether administered fully. Copious fluid enemata. Insufflation of air. Latter, though good in intussusception, not to be used where stricture is suspected. For severe pain, give opium or morphia with belladonna. Employ abdominal taxis, that is anæsthetize the patient, invert him, shake him, forcibly knead abdomen, give enemata in inverted position, prescribe prone position with pelvis elevated.* Operation should be done antiseptically. Seat of pain may indicate seat of obstruction. Bands are usually found in umbilical region. When the intestines are allowed to escape freely, considerable difficulty in returning them is likely to occur. Still it is sometimes necessary to allow it to a certain extent. Puncture is justifiable, to facilitate their return in cases of difficulty.—C. B. KEETLEY.

INTESTINES, Inflammation of—*See Enteritis.*

INTERTRIGO—*See Erythema.*

IODIDE OF POTASSIUM RASH is chiefly of two kinds, the acneiform and the bulliform, but it also produces purpura. In many patients iodide of potassium excites a rash which is not distinguishable from common pustular acne, save that it is not confined to the face, but is distributed irregularly in different parts of the body. This rash may be so inflammatory as to appear ecthymatous. The drug may also excite what seems at first sight to be a true bullous eruption, in connection with much general depression, ulceration of the tongue, and large fungatory sores originating apparently in the bullæ, which often freely crust before ulceration. But these so-called bullæ begin as hard, painful papulæ, and are, I believe, seated at the hair follicles. The iodide stimulates the glands, and the effusion of fluid sebum intermixed with serum is so free and rapid that the essentially acneiform or follicular character of the rash is lost in the quasi bullæ which result. These so-called bullæ are very tense, painful, and feel solid. They have very solid bases, often exude a thick, creamy, pus-like (?) fluid, and after bursting their base fungate into a large, raised, grayish-yellow papillated mass, which on healing away leaves a decided scar. Such cases are very rare indeed, and they occur in exceptional instances where persons have a peculiar idiosyncrasy as regards iodide of potassium. A few doses of the drug given for four days may excite this latter rash, and it will rapidly disappear when the drug is given up. (See *Chir. Soc. Trans.*, for a communication, with illustration, by Dr. Tilbury Fox.)

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* Judging from the appearances in a case in which gastrotomy was performed for intussusception, I think that before going through the above proceedings, it would be good, if the intussuscepted bowel had descended as low as the rectum, to attempt to steadily compress the lower end of the intussusception for some time, because in the above-mentioned case the difficulty in the evolution of the intussusception was mainly caused by the swollen and congested state of its lower end. (Compare with Mr. F. Jordan's mode of reducing paraphimosis).

It is also said to excite a purely bullous eruption undistinguishable from pemphigus occurring in the uncovered parts of the body especially.—*Epitome of Skin Diseases.—Fox.*

INTUSSUSCEPTION—*See Intestinal Obstruction.*

IRIDECTOMY—*See Iris, Diseases of.*

IRIS, Diseases of.—IRITIS.—*Causes.*—Syphilis, rheumatism, inflamed or ulcerated cornea, injuries as in operation for cataract.

Symptoms.—(1) Change in color; (2) change in mobility; (3) change in vascularity; (4) pain; (5) impairment of vision; (6) photophobia and lachrymation.

(1) Change in color is due to congestion and to effusion of lymph and serum into the texture of iris, as well as, in part, to turbidity of aqueous. It looks blurred and "muddy."

(2) Change in mobility is indicated by the pupil not responding actively to light, but becoming sluggish or quite inactive. The iris becomes more or less adherent by its posterior surface to the capsule of lens, constituting partial or complete posterior synechia; when partial the pupillary margin becomes jagged under atropine; when complete the pupil cannot be dilated by mydriatics. When exudation of a layer of lymph takes place into the pupillary area the condition is termed "occlusion."

(3) Increase of vascularity in the ciliary zone, around the margin of the cornea, generally occurs early, and the conjunctival vessels are generally congested.

(4) Pain of a neuralgic character in and around the eye, variable in degree.

(5) Impairment of vision is always more or less marked, may be owing to turbidity of aqueous, exudation of lymph on capsule in the pupillary area, impairment of accommodation by extension of inflammation to the ciliary body.

(6) Photophobia and Lachrymation may or may not be present.

In *Syphilitic Iritis*, which only occurs in secondary syphilis, there is tendency to effusion of lymph, and formation of nodules in the structure of the iris. It seldom relapses; it is often symmetrical; pain not generally severe.

In Rheumatic Irititis there is little tendency to effusion of lymph, nodules never formed, generally unsymmetrical, although both eyes may suffer in turns; frequently relapses at intervals of months or years; congestion and pain often severe; sight not much affected.

Treatment.—(1) Use atropine drops (atropiæ sulph. gr. ij. ad. ℥ j.) three times daily to prevent adhesions, or to break down those which may have recently formed, also to relieve pain and congestion.

(2) If pain and congestion be severe, apply leeches to temple, malar eminence, or septum nasi; repeat if necessary; apply blister to temple; avoid stimulants.

(3) For syphilitic iritis employ the treatment proper for secondary syphilis. For rheumatic iritis give alkalies, iodide of potassium, colchicum.

(4) Rest the eyes; all eye work to be discontinued; order a shade for both eyes; darken the room, or bandage the affected eye with a pad of cotton wool, especially in rheumatic cases.

(5) Iridectomy should be performed (1) in those cases in which judicious local and internal treatment have been tried for several weeks without benefit. (2) When adhesions exist and attacks are recurrent. (3) When there is complete exclusion of the pupil.

Operation of Iridectomy.—(1) Separate lids by a spring-stop speculum (2) With lance-shaped knife incise sclerotic one line from corneal margin and let the point enter anterior chamber just in front of iris, keeping point well forward to avoid wounding the lens. (3) Introduce iris forceps through wound, and seize iris near pupillary margin : draw this out through wound and cut off with fine scissors.

Artificial pupil is mostly made by (1) iridectomy; but for cases in which this is unsuitable one of the following methods may be adopted :—(2) By using a broad needle and hook. (3) By irido-desis, or ligature of iris. (Critchett's operation.) (4) By division of iris with Wecker's scissors introduced into anterior chamber (iridotomy).

Prolapse of iris generally follows penetrating and incised wounds of cornea. *Treatment.*—(1) By removal of prolapsed portion with fine-scissors. (2) By compress applied externally over closed lids. (3) By frequent puncturing of the prolapsed iris with a fine needle. In either of these methods a soothing treatment should be adopted. Atropine drops three times daily; bathing with belladonna lotion. After some days a shade should be worn, and the eyes carefully watched.

Coredialysis is a partial detachment of the iris from its ciliary border forming a second pupil. It is generally caused by a sharp blow. Congenital irideremia (absence of iris) is occasionally seen.

Coloboma of the iris (congenital cleft, appears like a very regular result of iridectomy downwards, or downwards and inwards; usually symmetrical; variable in degree; generally associated with a corresponding defect in the choroid.

Mydriasis (dilatation of the pupil is a derangement which may be caused by disease or by the action of mydriatic drugs, *e. g.*, glaucomatous tension of the globe; diseases of choroid or retina, optic atrophy, paralysis of third nerve. Mydriatics, sulphate of atropia, extract of belladonna, sulphate of duboisine, sulphate of daturine, etc.

Myosis (contraction of pupil) may be caused by spasmodic action of the circular fibres of iris, loss of power of radiating fibres of iris, hyperæthesia of retina, affection of spino-sympathetic filaments which supply the radiating fibres of iris, myotic drugs, *e. g.*, Calabar bean, sulphate of eserine, nitrate of pilocarpine.—H. Juler.

IRITIS—*See Iris, Diseases of.*

IRRIGATION.—Practice of passing a continuous stream of water, usually cold, over a wound. Various apparatus. Wide-necked bottle, with skein of worsted or strip of lint acting like a capillary syphon. Tins and india-rubber tubes. The bend where the india-rubber tubing passes over edge of vessel may be prevented from closing tubing up by lashing the curve in the tubing to a metal skewer bent into a gentle curve. Water may be medicated. Object of irrigation is to remove injurious discharges as fast as they are formed, and to keep down inflammation by action of cold.

ISCHÆMIA. Partial Cerebral Anæmia from Obliteration of Cerebral Blood-Vessels.—*Causes.*—Thrombosis of the arteries, embolism of the arteries, thrombosis of the veins or sinuses, embolism or thrombosis of the capillaries.

Symptoms.—These vary with the cause ; when due to thrombosis of the arteries they are in general, localized headache, persistent rather than severe, vertigo, difficulties in the faculty of speech relating both to the articulation and to the memory of words, incipient symptoms of paralysis, gradual advance with loss of power with periods of almost entire remission, impairment or abolition of sensibility on the paralyzed side, various forms of numbness, tingling and formication, loss of memory, a condition of apathy, somnolence.

When due to embolism of the arteries there are no premonitory symptoms, there is sudden loss of consciousness, followed by paralysis upon the side of the body opposite to the seat of the lesion, or there may be no coma but paralysis only or no paralysis and no mental symptoms except the partial or entire loss of the faculty of language. There may be ocular troubles, as ptosis, strabismus, or blindness.

When thrombosis of the cerebral veins or sinuses is the cause of ischæmia, the symptoms are, headache, epileptiform convulsions, paralysis of different parts of the body, particularly of the ocular muscles, giving rise to squinting and double vision, disturbances of sensibility and coma. Occasionally there is apoplexy at an early stage, a tendency to the formation of abscesses in distant parts of the body.

When ischæmia is to be attributed to embolism or thrombosis of the capillaries the symptoms are so indefinite and obscure that it is impossible in the present state of our knowledge to identify them.

Prognosis.—Where due to thrombosis of the arteries the prognosis is unfavorable; when caused by embolism of the arteries it is grave, unless the patient has passed safely over the first four or five days and the head symptoms have disappeared, when it is favorable; when thrombosis of the veins or sinuses is the cause the prognosis, unless the clot admit of removal, is unfavorable.

Treatment.—There is very little to be done besides meeting indications as they arise, and attempting to relieve the paralysis and other symptoms. Should the circulation be feeble, the skin cold, and the patient disposed to somnolence, the patient should be kept with the head low, brandy or other spirituous liquors administered, and the body wrapped up in warm blankets. Where nature in establishing collateral circulation so far overdoes it as to cause hæmorrhage from the rupture of vessels not accustomed to increased tension, to control this excessive action it may be necessary to give the bromide of potassium in large doses. For some time after the successful establishment of the collateral circulation, there is more or less feebleness of mind and body. For this condition strychnia and phosphorus are especially applicable and may be administered according to the formulas recommended under the heads of cerebral congestion and cerebral hæmorrhage. Electricity is almost always useful. Where the condition is brought about by thrombosis of the veins or sinuses life may in some cases be prolonged by the judicious administration of quinine and stimulants. Convulsions may be lessened in force and frequency by the employment of the bromides, and pain assuaged by hypodermic injections of morphia, by a pill containing half a grain of codeia, given at bed time and repeated if necessary, or by directly taking off a part of the intra-cranial vascular tension and by leeches to the inside of the nostrils, or cups to the nape of the neck.—WM. A. HAMMOND

ISCHIO-RECTAL ABSCESS.—Acute or chronic. Former usually occurs in strong constitutions, latter in weakly persons.

Symptoms.—Signs common to abscess everywhere. Chronic cases tend to spread nearly round rectum, and to form sinuses which may on the one hand burrow into buttock, and on the other become "fistulæ in ano."

Causes.—Blows, kicks, falls, anal fissures, ulceration, impaction of foreign body in rectum, phthisical constitution.

Treatment.—Acute abscess requires poultices, fomentations and ordinary treatment. Chronic abscesses should also be opened early by free incision, or great danger of fistula will be incurred. Treat general health.

ITCH—*See Scabies.*

ITCH, Baker's—*See Baker's Itch.*

ITCH Bricklayer's—*See Bricklayer's Itch.*

ITCH, Grocer's—*See Grocer's Itch.*

JAUNDICE.—*Natural History.*—Cases in which many of the different tissues and fluids of the body are dyed yellow, more especially the conjunctiva and the connective tissue, from the coloring matter of the bile, are known as cases of jaundice depending on certain morbid conditions—especially organic disease of the liver or duodenum. It may arise in two ways—(1.) By mechanical obstruction to the passage of the bile into the intestines, and the consequent re-absorption of the detained fluid into the blood; (2.) the suppression of the biliary secretion arising from some morbid condition of the liver itself, whereby biliary ingredients accumulate in the circulation. Some of these ingredients or constituents of bile are generated in the liver itself (*e. g.*, the bile acids), others exist pre-formed in the blood (*e. g.*, the green bile-pigment, or bilverdine, and the cholesterine). The mechanism of jaundice has therefore been regarded from two points of view, namely, (1.) Jaundice from suppression, retention, or non-elimination; (2.) jaundice from re-absorption of bile. In the former jaundice is characterized by the rapid accumulation of green bile-pigment in the blood, until the serum and the tissues and the urine are saturated with the coloring matter. Jaundice by suppression or non-elimination arises from (1.) Innervation; (2.) disordered hepatic circulation; (3.) loss or destruction of the secreting cells of the liver, as in acute and chronic atrophy, cancer, tubercle, fatty degeneration and lardaceous disease. The second class of cases of jaundice arises from the re-absorption of the secreted but retained bile. They are characterized by the accumulation of pigment in the blood; whence it stains the tissues, the urine and the serum. The bile in these cases is absorbed from the distended ducts and gall-bladder; and the biliary products manufactured in the liver, equally with those formed in the blood, find their way back into the circulation, to be eliminated by the excretions. Hence the bile-acids (absent in the former class of cases of jaundice) are present in cases of jaundice from re-absorption, as well as the bile-pigment; and these acids possess the property of dissolving the red-blood corpuscles. Obstruction is due chiefly to—(1.) Congenital deficiency (very rare); (2.) disease, generally of parts in the vicinity of the pancreas, or of the ductus communis choledochus. The earliest sign of jaundice is a yellowness of the white of the eyes, then of the roots of the nails; next yellowness extending over the face and neck, and ultimately over the trunk and upper and lower extremities. The urine becomes of a deep-red color, and stains linen yellow. At the same time that the urine is thus discolored, the stools, often abundant in quantity, are white. The pulse is slow, and the patient complains of a bitter taste in the mouth, has much thirst, an absolute inaptitude for all exertion, and suffers from a lowness of spirits amounting to hypochondriasis. The first symptom of recovery is the appearance of bile in the stools, after which the yellowness fades away in parts in the inverse order of its appearance.

It is necessary to determine in every case how far the jaundice is due to—(1.) Obstruction, or (2.) non-elimination (suppressed secretion). The presence of biliary acids in the urine is characteristic of jaundice from re-absorption, as distinguished from jaundice arising from non-elimination or suppression. "To a couple of drachms of the suspected urine add a small fragment of loaf sugar, and afterwards pour slowly into the test-tube about a drachm of strong sulphuric acid. This should be done so as not to mix the two liquids. If biliary acids be present, there will be observed at the line of contact of the acid and urine—after standing for a few minutes—a deep purple hue. This result may be taken as a sure indication that the jaundice is due to obstructed bile-ducts. On the other hand, the absence of this phenomenon, and the occurrence of merely a brown instead of a purple tint, although in the earlier stages of jaundice equally indicative of suppression, is no indication of the cause of the suppression, which must be gleaned from other circumstances.

Treatment.—As a general principle, the larger number of cases of jaundice from functional disorder will get well in time spontaneously, but may be aided by remedies judiciously selected according to the diagnosis already indicated. First, aim at removing the exciting cause; and in jaundice due to congestion of the liver, purgatives seem to act beneficially in the form of blue pill or Plummer's piil, with aloes, nux vomica and rhubarb pill mass. In cases of acute jaundice from suppression of the biliary secretion, two or three doses of hydrochlorate of ammonia, to the extent of gr. xx. every four hours, may produce a restoration of that secretion. It is a most powerful restorative of the biliary functions. Acids and alkalies are alike contra-indicated in cases of jaundice resulting from active congestion of the liver. Podophyllin, combined with hyoscyamus, is of use in jaundice from suppressed secretion of bile. It is especially useful combined with vegetable tonics, such as gentian and quinine, in cases of feeble liver action, but it ought not to be given in cases of jaundice from obstruction. Sulphate of magnesia, in half drachm to drachm doses, combined with fifteen grains of carbonate of magnesia and half a drachm of aromatic spirits of ammonia, given three times a day an hour before food, is most generally useful.—WM. AITKEN.

JAWS, Diseases of. (Partly noticed under heading, Antrum, Diseases of).

JAWS, CLOSURE OF.—*Causes.*—1 (very rare), ankylosis of temporo-maxillary articulation ; 2 (usual), cicatricial contraction after burns, scalds, cancrum oris, &c. *Treatment.*—In very slight cases the mouth may be forced open, and cicatrix stretched by screw appliances. But in most cases the only hope of relief lies in osteotomy. Two methods of osteotomy, one from within mouth (Rizzoli's), the other from without (Esmarch's). In the latter, which is preferred, a wedge-shaped piece of bone is cut out of lower jaw anterior to cicatrix. Operation for temporo-maxillary ankylosis consists in operating within the mouth, and cutting piece of bone out of ramus of jaw.

JAWS, NECROSIS OF.—*Causes.*—Blows, exanthemata, syphilis, salivation by mercury, chronic irritation of carious teeth, fumes of phosphorus. Cause sometimes obscure. *Signs.*—Firstly, those of ostitis, pain like toothache, swelling, &c. ; then suppuration, formation of sinuses, detection of exposed bone, offensive discharge. Effect on general health usually greater than necrosis elsewhere. *Pathology.*—That of other necroses. Phosphorus necrosis is said to attack only where there are carious teeth ; but Langenbeck denies this. Formation of new bone usually redundant ; but it tends to waste when the sequestrum is removed. A sinus opening externally near jaw sometimes merely signifies a carious tooth. *Treatment.*—Treat the cause. Remove sequestrum when it has fairly loosened, but not before. Avoid cutting skin if possible ; if unavoidable, make incisions below edge of jaw, and, in males, where whiskers may cover scar. Whole jaw has been removed piecemeal through mouth. Gargles and lotions of Condy's Fluid, borax, salicylic acid. In severe cases rest may have to be secured by bandages and gutta-percha or other splints. Tonics, soft nutritious food, fresh air. Fit artificial teeth to new jaw. Specific remedies where indicated. Lower jaw affected oftener than upper. Amorphous phosphorus does not give off the injurious fumes.

JAWS, TUMORS OF, may be cystic, fibro-cystic, fibrous, sarcomatous, carcinomatous, cartilaginous, fibro-cartilaginous, or osseous. A fibrous or sarcomatous tumor connected with the periosteum of the alveoli is called an "epulis." This has been noticed under that heading. Cystic tumors are the most common, and are noticed among the diseases of the Antrum, *quod vide*. Cartilaginous tumors are rare, but may be very large. Exostoses on the jaw are often of the ivory variety. *Diagnosis.*—See article on Tumors in general. The chief point is to recognize innocency or malignancy. Malignant growths increase rapidly, are usually softish, infiltrate neighboring parts, affect glands, are painful, and sooner or later tend to fungate. *Treatment.*—Open simple cysts by a very free incision, stuff with lint, and allow to granulate up. Other tumors must be removed thoroughly with knife, small saw, and cutting pliers. Bad cases may require removal of part or even whole of jaw itself. See Excision of Jaw.

EXCISION OF LOWER JAW.—Partial or complete. Done for tumor of bone. *Incision.*—Depends on extent of bone to be removed. Considerable portions can be taken away through an incision entirely within the mouth. Larger portions require an incision along the lower margin of the jaw and chin. This, if necessary, may be extended upwards in the median line towards the lip ; but only tumors of rare magnitude justify division of the lip itself. A tumor which reached from two inches above the zygoma nearly down to the clavicle required a curved incision from the front of the ear to and through the lower lip. Many tumors may be almost entirely separated from their connections before even the facial artery need be divided. In the large tumor above referred to, this artery was cut by the last touch of the knife, and tied almost before it spurted. All bleeding vessels should be secured without delay, as free hæmorrhage is peculiarly embarrassing in operations about the mouth. In the smaller tumors, a tooth is extracted on each side of the growth, and the jaw partially sawn through and partially divided by cutting forceps. When the symphysis has to be removed the tongue must be perforated and held forward by a piece of whipcord, lest it fall back and close the glottis. This whipcord may be removed after twenty-four hours. When the ramus is encroached upon, disarticulation is necessary. Then keep the edge of the knife close to the bone, lest the internal maxillary artery be divided. Strong forceps may be useful. Depress the bone well, and open the joint from the front. Do not divide or remove any more mucous membrane than can be helped. It is worth remembering that, in case of dangerous hæmorrhage after an extensive operation of this kind, the external carotid, or even the bifurcation of the common carotid, can easily be compressed between the finger in the pharynx and the thumb on the skin of the neck. Anæsthesia should be effected through Trendelenburg's trachea-tampon and tube or Mills' apparatus.

EXCISION OF UPPER JAW.—Complete or partial. Performed for tumor of the bone. Complete incision. Incise skin, &c., down to bone along a line through middle of upper lip, round ala of nose, up to near inner canthus of eye, and lastly along lower margin of orbit. Very large growths may require also a cut through cheek from angle of mouth to malar bone. Turn this flap out and divide bone in the following places, in whatever order may be found most convenient in each individual case, but preferentially as follows :—(1) zygoma, (2) outer wall of orbit into spheno-maxillary fissure, (3) inner angle of orbit, (4) hard palate and alveolar process, through socket of central incisor tooth, previously extracted. Effect each division with cutting forceps ; but commence each, except the third, with a narrow saw. Now apply lion forceps, depress the bone, separate remaining adhesions with fingers rather than with knife, and wrench out. Avoid unnecessary injury to soft parts of palate. The removal is comparatively easy in a child, because the sutures are much less firm (H. Marsh). Arrest hæmorrhage, pad the cavity, replace the cheek-flap. Suture. Hare-lip pins through lip. *Prognosis.*—Large majority of cases recover. Chief dangers, hæmorrhage and blood-poisoning. Death on operating-table perhaps commoner in operations about jaw than in any others.

PARTIAL EXCISION OF UPPER JAW.—There are growths which affect so limited a part of the upper jaw that it would be barbarous to remove the whole bone for them. The orbital part may be excised and the palate left, or *vice versa*. Still more limited operations sometimes suffice. The external incision is done in the same line as that for total excision, but made no longer than is necessary in each case.—C. B. KEETLEY.

JAW, Dislocation of—*See Dislocations.*

JAW, Fracture of—*See Fractures.*

JOINT DISEASE, Charcot's—*See Charcot's Joint Disease.*

JOINTS, Diseases of.—1. Acute synovitis. 2. Acute suppuration (or abscess, or acute suppurative synovitis). 3. Acute ostitis of a joint (inflammation of the articular end of a bone). 4. Chronic synovitis, with which is usually considered hydrops articuli. 5. Chronic "joint disease." White swelling. Strumous joint* (including both "pulpy degeneration of synovial membrane," and ulceration of cartilages"). 6. Chronic rheumatic arthritis (rheumatic gout). 7. Acute rheumatism. 8. Gout. 9. Gonorrheal rheumatism. 10. Pyæmic arthritis. 11. Puerperal rheumatism (from 7 to 11 commonly called specific inflammations). Loose cartilage. Ankylosis. Neuralgia of joints. Neuromimetic or hysterical joint.

"Of late, great importance has been attached (especially by French surgeons) to speaking, first, of diseases of the synovial membrane, then of those of the cartilage, articular capsule, and bone, corresponding to the anatomical conditions. Correct as this division would be if it were only a question representing the pathological anatomical changes, it is of little use in practice. The surgeon always views inflammation of the joint as a whole, and although he should know which part of the joint suffers most, this is only a part of what he should know; course, symptoms, and constitutional state equally demand his attention and determine the treatment. Hence the entire clinical appearance will determine the divisions of this, as of many other diseases."—Billroth.

ACUTE SYNOVITIS.—*Causes.*—Usually exposure to cold. Often blows or sprains. Predisposing cause sometimes, e. g., syphilis, rheumatic constitution, etc. But specific inflammations are noticed separately. Joints least supplied with a covering of soft parts are most liable. *Signs.*—Pain, heat, and swelling, but not usually redness. Great tenderness. Swelling has a characteristic shape, bulging out exactly where the synovial membrane would tend to pouch when distended. Fluctuation. Tension sometimes great enough to prevent fluctuation. Feverishness. *Pathology.*—Synovial membrane is actively congested, and cavity of joint distended with sero-synovial fluid, usually clear, but occasionally containing a few corpuscles o a little blood. *Prognosis.*—Altogether good, unless constitution be bad o treatment neglected. *Diagnosis.*—Distinguish from acute inflammation o any neighboring bursa. Consider position and shape of swelling an history of case. *Treatment.*—Rest; splint or "fixed apparatus." Atten

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*These terms are used often as if quite synonymous. But some surgeons confine t term "strumous" to cases in which they believe the patient is originally of a scroful constitution; some surgeons would discard the term "strumous" altogether; and so even use *clinically such terms as* "Ulceration of cartilage," just as if such a term *scribed a primary disease.*

to position according to joint affected. Cold. Pressure. Wet bandages. Cotton wool compress and bandages over it. Leeches. Hot fomentations. Dover's powders internally. For specific cases give specific drugs.

Acute Suppuration or Acute Abscess of Joint.—*Causes.*—Sometimes one or more of the causes of ordinary acute synovitis. Sometimes the opening into the joint of an abscess in the neighboring soft tissues or bone. The commonest cause is a wound of the joint. *Signs and Diagnosis.*—Acute pain and swelling; redness and œdema, which may disguise fluctuation. Fixation in some position peculiar to each joint, *e. g.*, flexion and external rotation in case of knee-joint. High fever and rigors. After a time fluctuation appears, not only in the joint, but often also in its neighborhood (secondary abscesses). High fever continues. To distinguish a superficial abscess near a joint from acute articular suppuration, notice that in the former case the symptoms are so localized that some part of the joint will be accessible to examination, and be found healthy. The centre of an extra articular inflammation will perhaps be noticed to correspond to some bursa, or to some superficial injury. *Prognosis.*—Destruction of joint very probable. Danger to life great in old age, if joint be a large one. Danger of pyæmia. Best result that can usually be expected in ankylosis in good position. Complete recovery from early stage possible. *Pathology.*—In early stage, synovial membrane is red, greatly swollen, puffy and infiltrated with corpuscles and serum. Contents of joint are, synovia mixed with more or less pus. In later stage, synovial membrane is red, covered with fibrous rinds, and partly ulcerated; the contents of the joint are thick yellow pus, mixed with fibrous flocculi, the cartilage is breaking down, and even the adjacent cancellous bone inflamed. *Treatment.*—If called to the case early, and there is sufficient reason to believe that the stage of actual abscess and synovial cavity filled with thick pus has not been reached. Anæsthetize patient. Place the joint in a suitable position. Pad both limb and joint freely with cotton wool. Then apply a fixed apparatus (plaster of Paris, or starch and millboard) from near the extremity of the limb to a considerable distance above the joint affected. Be extremely careful to bandage evenly. Place ice-bags over joint. Give morphia subcutaneously. Elevate limb. Great benefit is often derived from extension by weights. If the case is more advanced, or if it gets worse under the above treatment, and if the evidence of abscess in the joint is unmistakable, the question of opening the joint presents itself. Grooved needle or aspirator may be used to confirm diagnosis. Unless a drainage-tube is used, make free incisions, as Gay recommends. Antiseptic precautions very desirable. Many cases calm down into a chronic state.

Acute Ostitis of a Joint.—*Inflammation of the Articular end of a Bone.*—Inflammation of spongy bone-substance adjacent to a joint is very rarely acute: though chronic joint disease frequently begins in the bone. *Causes.*—Obscure, when the affection cannot be traced to injury. *Signs and Pathology.*—Those of Ostitis, *quod vide.* Pain, heat, and swelling. Redness combined with œdema when suppuration occurs. Synovial membrane of adjacent joint becomes implicated. Effusion into joint. In childhood, whole articular epiphysis may separate. Partial necrosis more probable in adults. *Prognosis.*—The disease may be known to have begun in the bone by the thickening of that part,* and by the history. *Prognosis.*—Danger of acute articular abscess, or in the event of acute inflammation being allayed, of chronic destructive disease of the joint. *Treatment.*—*See* Inflammation of Bone. Rest, elevation, cold, painting with iodine, &c Perhaps occasionally abscess may be prevented from opening into joint by a timely opening from without.

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* It is not really the bone itself which is thickened, but the periosteum and soft parts over it.

CHRONIC SYNOVITIS. HYDROPS ARTICULI.—*Causes.*—Same as those of acute synovitis, of which affection it is usually a sequel. *Signs.*—Almost always attacks the knee. Young men most liable. Swelling and fluctuation of all the synovial pouches of the joint. Little or no pain or tenderness. The use of the joint is sometimes not much impeded, but it usually causes fatigue and pain. *Diagnosis.*—From white-swelling, by the absence of apparent thickening of the articular ends of the bones, of signs of ulceration of cartilage, of the great wasting of the limb which almost always occurs in chronic destructive disease of the joint, but above all by amount of effusion. In early stage age should be considered. Hydrops occurs chiefly in young adults, strumous disease mostly in children. *Prognosis.*—Little or no danger of hydrops articuli leading to any serious joint disease. Relapse after cure very common. *Treatment.*—Perfect rest, counter-irritation, and, above all, compression with the strong elastic bandage. By means of a soft elastic bag containing water and placed beneath the elastic bandage, the pressure can be measured and regulated to a nicety, without removing the bandage. I have found the hydraulic pressure of a column of water 28 inches high sufficient; but this point must vary with the case.* Scott's dressing. Failing these methods, aspiration may be combined with elastic pressure, or tapping with injection of iodine. In case of knee-joint insert a trocar and canula close to side of patella, draw off fluid, inject tinct. iodi., aquæ, aa ℥ss. Let iodine escape after three to five minutes, according to amount of pain. Now put up limb as after punctured wound of joint. Splint, swing, or starched bandage, &c. Iodine injection is dangerous both to life and limb, and can very rarely be justifiable. Joint may be tapped and drained with antiseptic precautions.

CHRONIC JOINT-DISEASE.—*White Swelling.*—*Strumous Disease of Joints.*—Including Pulpy Degeneration of Synovial Membrane, "Ulceration of Cartilage" (and Articular Ostitis when it leads to chronic degeneration of the adjacent joint).—To anyone more familiar with chronic joint-disease in books than in the human body, the above long heading may seem unnecessarily fraught with confusion. But I trust that it is not so; for, although some of the above terms represent different conditions at the outbreak of disease and for a short time afterwards, yet these different commencements almost always tend towards the same course and termination, viz., implication of every element of the joint, synovial membrane, cartilage, bone-surface, and ligaments. There are numbers of diseased joints which, even when exposed to the eye by excision, amputation, or death, do not reveal the origin of their disorganization. Moreover, in deciding upon a plan of treatment, one considers not so much what was the commencement as what is the present state; not what was, but what is, determines the decision. Still it is true that the consideration of the past may throw light on the future. Moreover, examiners sometimes base their questions on anatomical pathology. Therefore care will be taken in the following notes not to lose sight of anatomical distinctions. *Causes.*—Most cases can be traced to blows or falls, or exposure to wet or cold. Strumous constitution predisposes. As any acute inflammation of a joint may become chronic, so every cause of acute may also be a cause of chronic arthritis, including gonorrhœa and other specific influences. But it is rare for gout, syphilis, or acute rheumatism to lead to destructive inflammation of a joint. *Pathology.*—Commencement may be in synovial membrane (usually after blows, cold, or specific disease), or in ligaments (usually after sprains), or in bone (often in strumous constitutions); but, according to modern pathology, seldom or never in cartilage. When the synovial membrane is affected primarily, the result is Brodie's "pulpy degeneration of synovial membrane." In this disease parts of the synovial membrane swell, look œdematous, pulpy, reddish-grey, and soft. This condition spreads, eating up, so to speak, the underlying cartilage. The microscopical structure of the pads and tufts of swollen synovial membrane becomes identical with that of vascular granulations. In the subjacent layer of cartilage which is in process of conversion to the same granulation-tissue, the cartilage cells themselves divide, proliferate, and assist in the dissolution of the matrix of their own cartilage. In this way the pulpy tissue reaches the bone. The process does not stop here, but the bone itself inflames, erodes, and now the joint is carious. In the mean time the ligamentous structures of the joint have been softening, thickening, and, in some places, perhaps, yielding to the encroachments of the pulpy tissue, which may even pierce the skin and present externally as a fungous granulation. At the same time that the synovial outgrowths are destroying the cartilage, destructive inflammation may appear in the articular lamella of the bone, so that the cartilage is attacked both above and below, like a whale between a "thrasher" and a sword-fish. When the disease begins in the ligaments it is usually in the hip or knee joints, which have internal ligaments. From these it spreads to either the synovial membrane or the bone, or to both. Then the features of the case cease to have anything to distinguish them from those of disease originating elsewhere. The frequency with which disease begins in the ligaments is a point not yet settled. Disease beginning in the bone: Ostitis is the commencement of most cases which are genuinely strumous, and of many cases which are not strumous at all. The prime appearances are those of Inflammation of Bone, quod vide. Sometimes the joint becomes implicated, because the inflamamatory action in the articular lamella spreads to or separates the cartilage. Sometimes necrosis or caries leads to abscess which bursts into joint. The course of events leads to synovitis, which spreads all around the joint, to pulpy thickening of the synovial membrane, and to its usual results, as described above, on both faces of the joint. In rare cases the bone becomes full of soft tuberculous matter. However the disease may begin, if it go on, the ligaments give way, the ends of the bones become displaced, and perhaps necrose wholly or partially. Suppuration and the formation of sinuses often do not occur, especially when the patient, excepting his articular disease, is healthy. The most profuse suppuration occurs in the weakest and most ill-nourished, or else when acute suppurative synovitis becomes chronic. *Symptoms and Course.*—Insidiousness of first stage, (unless affection is a sequel of acute disease). In case of joints of lower extremity, limping, occasional complaints of pain or weakness. Surgeon soon detects signs of a synovitis, marked much more by thickening of synovial membrane than by effusion into joint. See notices under names of individual joints, *e. g.*, Hip-joint. Or the first symptoms observable may be those of articular ostitis. The limb assumes a peculiar appearance, distinguished by the swelling and pallor of the diseased joint, and by the wasting of the muscles. The joint assumes a bent position. At a later stage, dislocation takes place. Suppuration may occur at any time, or not at all. Sinuses. Fungous granulations. When bone becomes affected, starting pains at night, excruciating pain on sudden movement or on pressing joint-surfaces together. Sometimes secondary abscesses. Grating may indicate roughness of cartilages. Necrosis may be guessed at from the history or from occurrence of marked crepitus, but can only be certainly known when joint is open. Probe may not detect caries when granulations cover the diseased bone. Granulations fungating through a sinus almost always indicate caries .*Prognosis.*—Depends on (1) patient's constitution, (2) his nutritive condition, (3) his command of time and *money, (4) the* joint affected, (5) the anatomical origin of the disease, (6) the treatment adopted. Where there is also phthisis or kidney-disease the case is almost hopeless. The state of nutrition is the most important. Poor patients sometimes cannot afford to wait until nature cures the disease, and prefer amputation: the surgeon can rarely be justified in acting on this consideration. Moreover, fresh, healthy, highland or sea air is denied to urban poor. Primary osseous disease is of worse prognosis than synovial. *Treatment.*—General and local. *General.*—Indications: (1) to improve nutritive condition, (2) to obtain best possible conditions of fresh air cheerful light, sound sleep, &c. In many cases general rest, in the sense of total confinement to bed, not desirable. Rather combine general, out-door, moderate exercise, with local rest. But long intervals of repose and gentleness of exercise essential. Cod-liver oil, iron, quinine, milk, &c., according to special features of case. *Local Treatment*—Indications: (1) perfect rest, (2) one or more of the following remedies:—A firm plaster case over a flannel bandage, and extending from some way below to a considerable distance above the joint affected. Instead of plaster of Paris, starched bandage and millboard may be used. Scott's dressing, *i.e.*, ung. hydrarg. co. rubbed on joints and then strips of pitch plaster spread on leather applied to it. Gentle uniform pressure with elastic bandage such as "Martin's.' Hydraulo-elastic pressure. Extension by weights. Extension by Sayre's splints. Elevation. Suspension in Salter's swing. Continuous cold; ice bags. Counter irritation. "Firing." Blisters. When acute exacerbations supervene, a few surgeons recommend leeching. Perfect local rest not always desirable. A certain amount of gentle or of passive exercise, combined with "shampooing" and the elastic bandage, better for some cases.—See Barwell in "Practitioner," vol. viii. p. 365. At a certain age arises the question of excision, or of excision versus amputation. This is decided by considering (1) the joint affected; (2) state of general health; (3) state of kidneys, lungs and liver: (4) the stage of the disease; (5) whether operation is required to save life or merely to shorten period of illness and treatment. While excision may frequently be useful in the elbow and hip, and sometimes in the wrist, it can seldom be desirable in the shoulder (except after gun-shot wound or compound fracture); and some surgeons never excise the knee. See articles Excision and Amputation. Swabbing out joint with dilute sulphuric acid (one in three). Operative measures of any kind rarely justifiable until joint is on the point of opening spontaneously. Suppuration and free discharge do not counter-indicate plaster cases. Small windows can be cut in the case. These windows should be really small, *i. e.*, not large enough to spoil the case as a uniformly supporting agent. Sinuses may be slit up and loose pieces of necrosed bone removed.

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* *But to prevent relapse, it is necessary* to insist upon the patient's wearing a common *stic bandage round his joint* for months after leaving hospital.

CHRONIC RHEUMATIC ARTHRITIS. RHEUMATIC GOUT.—*See Rheumatism.*

GONORRHŒAL RHEUMATISM.—An affection of the joints occurring in the course of a gonorrhœa. Relation of the two diseases uncertain. The arthritis may be due to blood-poisoning, or to reflex irritation through spinal cord; for it seems that various affections of the genitals will cause inflammations of the joints. *Symptoms.*—It usually attacks knee, hip, wrist, ankles, especially knee. Pain, stiffness, swelling, heat; various degrees of acuteness or of chronicity. Seldom goes on to suppuration and disorganizations of joint. Usually confined to synovial membrane and ligamentous structures. *Pathology.*—The appearance of synovitis, ostitis, or abscess are not characteristic of the gonorrhœal origin. *See* above for pathology of Synovitis, &c. *Prognosis.*—Considerable danger of ultimate ankylosis. Often complete recovery. Relapse may occur if gleet return. *Treatment.*—Cure the gonorrhœa or gleet. Make the urethra aseptic (*see Gonorrhœa*). Treat the joint-affection according to the rules given above for the particular form of joint-inflammation each case of gonorrhœal rheumatism may most resemble. When chronic arthritis persists after **gonorrhœa is cured**, great benefit is often derived from an elastic bandage, and **ten-grain doses** of pot. iod. *ter die*.

NOTE.—The muscular pains often occurring in the course of a gonorrhœa are by some classified as a form of gonorrhœal rheumatism. Cure the cause, and direct flannel to be worn. Chloral may be necessary at night. Change of climate.

LOOSE CARTILAGES.—*Causes.*—They grow, like warts, on the synovial membrane, and afterwards break off;(2) they are, in rare cases, pieces chipped off the joint of cartilage itself. (3) There is also a theory of their formation by a process identical with that of "Quiet Necrosis" (Paget's Clin. Lect. p. 343, and Teale). *Symptoms.*—Liability to sudden and sickening attacks of pain, caused by certain movements, and followed by synovial effusion. The loose cartilage may, in many instances, be felt near the superficial aspect of the joint. These symptoms make the diagnosis quite clear. *Pathology.*—Number usually single, but sometimes very numerous. Shape rounded or flattened with rounded edges. Size from that of a shot to that of a broad bean, or, in exceptional cases, much larger. Structure rarely cartilaginous, usually fibrous. Joint most commonly affected, the knee. *Treatment.*—1. India-rubber bandage and moderation in exercise of joint, especially restraint from violent motions. Perseverance in this may cause permanent cessation of unpleasant symptoms, perhaps adhesion of the loose cartilage to a convenient part of the joint. 2. Operative. This must be either subcutaneous or antiseptic. *Subcutaneous excision.*—Fix the cartilage between the finger and thumb; then pass a tenotome through the skin at a distance, and, with it, divide the capsule of the joint until the cartilage can be squeezed out into the areolar tissue. Fix it there by strapping, &c., and place the limb on a splint, or in a plaster of Paris case. A week afterwards, if the surgeon choose, he may cut out the cartilage altogether.—*See Square, Med. Times*, vol. ii. 1857.—C. B. KEETLEY.

JOINTS, Keys and Guides to the—with Descriptions of Articular Amputations.—The term "keys" is employed by the writer to indicate certain ligaments, or muscular and tendinous attachments, by the cutting of which the joints may be readily unlocked or laid open to view, and partially separated, so that the farther disarticulation may be effected without any hesitation or false cuts.

The study of this subject is important in connection with articular amputations and exsections; indeed, it lies at the foundation of success in these procedures.

The "guides" to the articulations, or those superficial anatomical irregularities which point to the situation of the joints, are necessarily considered in the same connection. It seems proper to remind the reader of the importance of this study, also, in connection with the diagnosis of dislocations, and of fractures involving the joints.

1. PHALANGEAL ARTICULATIONS. — *Key: Lateral ligaments.* — The phalangeal articulations are ginglymoid, or hinge-like, admitting of no motion but flexion and extension. Each articulation is supported by a capsule, two lateral ligaments, and the flexor and extensor tendons. When the last phalanx is flexed to a right angle upon the second phalanx, the distal end of the second phalanx is completely uncovered, the proximal end of the last phalanx moving off from the second. To open into the joint, therefore, with the fingers flexed, the knife must be applied to the dorsal surface, about one-fourth of an inch beyond the most projecting point of the knuckle. This will sever the extensor tendon, and open the capsule, bringing the joint surface completely into view; but it will not "unlock" the joint. Indeed, there will be no greater freedom of motion

than existed before the incision was made. If now the operator will proceed to cut one or both of the lateral ligaments, the joint-surfaces will at once separate freely, and the knife can easily complete the amputation.

The same rules apply to all of the phalangeal articulations, whether of the hand or foot. It must be especially remembered that the tendons, although they hug the joints closely, have nothing to do with keeping the joint surfaces in contact. They are capable of being elongated by extension, and if the capsule and lateral ligaments are cut, they offer no impediment to the separation of the articular surface. The lateral ligaments are the only keys, properly speaking.

2. META-CARPO-PHALANGEAL ARTICULATIONS OF THE THUMB, OF THE GREAT AND RING FINGERS.—*Keys : Lateral ligaments.*—The meta-carpo-phalangeal articulation of the thumb and of the fingers are also called ginglymoid, but they approach nearly the character of enarthrodial, admitting of considerable lateral motion. Their lateral ligaments are, for this reason, easily exposed to the knife, by throwing the phalanx to the opposite side. In amputating at the meta-carpo-phalangeal articulation of the thumb, or of the great, or ring finger, it is immaterial which of the lateral ligaments be chosen as a key.

It must not be forgotten that, in order to enter the joint from the dorsal surface, when the phalanx is flexed to a right angle, the knife must be placed, in the adult, about four lines below the most salient point of the convexity of the knuckle, that is, a little farther toward the distal end of the finger, than in the case of the phalangeal articulations.

3. META-CARPO-PHALANGEAL ARTICULATION OF THE INDEX FINGER.—*Key: Internal* (*ulnar side*) *lateral ligament.*—I have chosen the internal lateral ligament in the case of this joint, for the reason that when it is divided, the finger can be thrown freely over to the radial or outer side, and the operation can be completed with a little more expedition. If the external lateral ligament is divided first, the adjoining finger will prevent, in some measure, a similar free deflection to the opposite side.

4. META-CARPO-PHALANGEAL ARTICULATION OF THE LITTLE FINGER.—*Key: External* (*radial side*) *lateral ligament.*—This is chosen for the same reason just given in the case of the preceding finger.

5. CARPO-METACARPAL ARTICULATION OF THE THUMB.—*Key: Internal lateral ligament* (*ulnar side*).—This will be more easily found and cut than the external ; and, provided the flaps are already made and the whole length of the bone exposed, the thumb can then be forcibly thrown to the radial side and the joint completely opened. By this method also, the operator is in less danger of wounding the radial artery, where it dips down between the first and second metacarpal bones to form the deep palmar arch.

To one who has not made the experiment upon the cadaver, or upon the living body, the opposite (external) lateral ligament would seem to be the proper key, but actual experiment will demonstrate that it is not.

6. CARPO-METACARPAL ARTICULATION OF THE LITTLE FINGER.—*Key: External lateral ligament* (*radial side*). The same arguments apply in this case as in the case of the preceding articulation.

7. RADIO-CARPAL ARTICULATION (WRIST JOINT).—*Key: External lateral ligament* (*radial side*).—Attempts to approach this articulation from either the palmar or the dorsal surface, are often, with the experienced surgeon, attended with embarrassments. On the palmar surface he is in danger of falling between the two rows of carpal bones, or of getting above the expanded margin of the lower end of the radius. On the dorsal surface he is equally in danger of falling between the two rows of carpal bones. Approaching from the inner or ulnar side, it is quite possible for him to insert his knife below the pisiform or unciform bones. From the

outer, or radial side, all these dangers are shunned. Feeling for the lower end of the outer styloid process and dividing the external lateral ligament, the articulation between the radius and scaphoid is easily exposed and the disarticulation effected without difficulty.

8. ELBOW JOINT.—*Key: External lateral ligament.*—This is a complex, but purely ginglymoid articulation, admitting of no lateral motion. The joint is supported by its capsule, by its anterior and posterior ligaments, both of which latter are thin and loose, only limiting the joint in its extreme conditions of extension and flexion, and by the lateral ligaments, both of which are stout and strong and hold the joint-surfaces compactly together. The division of either one of these ligaments would unlock the articulation; but when the joint is still covered with integument and muscle, the exact position of the internal lateral ligament is with difficulty defined. There is usually however, no difficulty in finding the external lateral ligament, which passes from the external condyle of the humerus to the orbicular ligament, inclosing the head of the radius. The following rule is to be observed in searching for this ligament:—

The forearm of the patient is flexed to a right angle with the humerus, so as to displace the mass of muscle which conceals the head of the radius partly, when the forearm is extended. The right hand of the surgeon grasps the right hand or wrist of the patient, while the left seizes the elbow in such a manner as to place the thumb upon the external condyle of the humerus. The thumb is then allowed to slide off from the condyle toward the hand until only the upper margin of the thumb touches the condyle, when its lower margin will be felt resting upon a slight elevation, which is the head of the radius. The space between these two points is, in adults, about half an inch. Pressing down with some firmness upon the head of the radius, while with the right hand the radius is pronated and supinated, its head will be felt rotating under the thumb. The head of the radius rotates upon its own axis, and, to recognize its motion, it is generally necessary to move it slowly and observe it attentively. The patient must also be instructed not to aid in the motion of rotation, otherwise the contraction of the muscles will obscure the sensation. With these precautions the surgeon will seldom fail to recognize the head of the radius; and he will even be able to define accurately the situation of its upper margin and to put a pin into the joint, if he chooses to do so, with almost unerring certainty. This is the precise point where, by a transverse incision, he will cut the external lateral ligament and freely expose the joint.

In case the operator were intending to make an amputation with a single anterior flap, he may now, having entered the articulation at the head of the radius, carry his amputating knife around across the posterior aspect of the arm to the opposite or ulnar side, cutting through the integuments down to the bone. Then, the assistant having completely and somewhat forcibly extended the forearm upon the arm, the surgeon may rapidly make the anterior flap, raising it up well to the articulation; and finally, placing the edge of the knife vertically upon the front of the joint, so that its extremity, near the point, rests in the open articulation between the radius and humerus; with one single sweep he will sever the remaining attachments of the biceps, the brachialis anticus, the anterior ligaments, the capsule and the internal ligaments, leaving nothing to be divided but the olecranon process, the section of which will be completed by the saw.

It is important in this procedure to extend the arm before the section of the brachialis anticus, etc., is made, otherwise the knife will strike against the coronoid process of the ulna.

Nothing can exceed the facility and rapidity with which disarticulation at the elbow-joint can be made by this method.

There is another important purpose to which a precise knowledge of the situation of the head of the radius and of its articulation may be applied, namely, to the diagnosis of dislocations, fractures, etc., about the joint.

If the head of the radius alone is dislocated in any direction, a careful examination after the method I have described will decide the fact.

The ulna is so seldom dislocated alone at its upper extremity, that it may almost always be safely assumed that this is not the character of the accident. If, therefore, the head of the radius is found in place we can pretty safely say that the ulna is not dislocated; and, of course, that it is not that very common accident, a dislocation of the radius and ulna back, nor indeed in any other direction. It is thus that the position of the head of this bone, in itself alone, not unfrequently will decide all the questions relating to dislocations about the joint. There is no other single point about the articulation which can ever be made to convey the same amount of information; and the surgeon ought to familiarize himself with its position by repeated examinations upon different persons. It is one of the secret arts of expertness in the diagnosis of elbow-joint injuries.

9. SHOULDER JOINT.—*Keys: Coraco-humeral ligament, with the muscles attached to the greater and lesser tuberosities.*—In amputation at the shoulder joint, the method which I have found to be the most easily executed and most economical in the saving of blood, is as follows:—

First step.—An assistant seizes the fore-arm at the elbow and wrist, and in order that he may control its motion more perfectly, flexes it to a right angle with the humerus. He then raises the humerus to a right angle with the body. The surgeon, if it be the right arm, standing on the left side of the body and arm, with his face to the patient's head, grasps with his left hand the muscular eminence formed by the deltoid muscle, and with his right hand, holding a large common bistoury, forms an oval, external flap, the apex of which reaches to within two or three inches of the insertion of the deltoid, and the base of which extends from near the coracoid process in front to a corresponding point below the acromion process behind. This flap is now rapidly dissected up until the outer extremity of the acromion process is fully exposed.

Second step.—The assistant is directed to lower the arm nearly or quite parallel to the body, so as to expose more fully the head of the humerus, and especially its capsule and coraco-humeral ligament. The knife, placed with its flat surface against the acromion process and its edge directed toward the head of the humerus, divides the coraco-humeral ligament, the upper portion of the capsule and, perhaps, the long head of the biceps. These structures constitute the *first* key to the joint. This section does little more, however, than to open it fairly to view.

Third Step.—The assistant, still holding the forearm at a right angle with the arm, rotates the humerus forcibly inwards, while the surgeon, with one sweep of the knife, divides the supra-spinatus, the infra-spinatus, and the teres minor. These muscles constitute the *second* and most important key to the articulation, and it is quite possible now to open the joint sufficiently to pass a knife between the head of the humerus and the glenoid cavity of the scapula. They are all inserted into the greater tuberosity, and inasmuch as they approach their points of insertion from above, from behind and from below, the knife must be carried around the tuberosity with a firm hand and in such a direction that the lower half of the incision shall pass down behind the tuberosity, parallel to the axis of the humerus; indeed, the lower portion of the teres minor, having a slight muscular insertion into the humerus below the tuberosity, it is well to extend this incision a little below the tuberosity, and to incline it here slightly forwards.

Fourth Step.—The assistant next rotates the humerus forcibly outwards, exposing the lesser tuberosity, and the surgeon, with a similar sweep around this tuberosity, divides the subscapularis. The subscapularis is the *third* and last key.

Fifth Step.—The joint now separates widely, and the surgeon, changing his bistoury for a seven or eight inch amputating knife passes through the joint, dividing the remainder of the capsule and the long head of the triceps. Turning now the edge of the knife toward the humerus, the incision is prolonged downwards, hugging closely the posterior surface of the bone to the extent of three or four inches.

Sixth Step.—A second assistant, following the incision made beneath the head of the bone, passes his two thumbs from opposite sides into the wound and seizes the axillary artery between his thumbs and fingers, holding it firmly, while the surgeon completes the section of the axillary tissues.

The amputating knife employed in this last step of the operation ought to have a straight, dull back. A double-edged knife endangers the hands of the assistant, and possesses no advantages.

It will be noticed that the second and third keys to this articulation are not, as is uniformly the case in other joints, ligaments, but muscles or tendons. That is to say, the muscles, rather than the ligaments, hold the joint ends of the bones in contact.

This fact admits of easy explanation. The shoulder joint has a greater latitude of motion than any other joint in the body. The capsule is, therefore, very loose, so that when all others of the soft parts are cut, it allows the bones to separate more than one inch. Only one ligament connects the scapula to the humerus, namely, the coraco-humeral; which, passing obliquely across the joint, from the coracoid process to the greater tuberosity, can only imperfectly limit its motions, and has no effect in holding the articular surfaces in contact. The muscles and tendons which embrace the joint, however, have such attachments and anatomical characters as to reinforce the capsule; and they do, in fact, take the place of ligaments. The long heads of the biceps and of the triceps, inserted respectively into the upper and lower margins of the glenoid cavity, have considerable effect in this regard; but, chiefly, the head of the humerus is held in place by the three short and strong muscles which I have named, coming from the back of the scapula, and which are inserted into the greater tuberosity. The power to accomplish this and to reinforce the capsule is greatly increased by their attachment to the capsule itself. The truth of this assertion is readily verified by a division of their tendons near the point of their attachment; when it will be plainly seen that they constitute the second and most important key to the articulation. The subscapularis, coming from the opposite side of the scapula and inserted into the lower tuberosity, is also short, strong, and is attached to the capsule itself, so that the joint cannot be completely opened until its tendon also is divided. This, therefore, constitutes the third key to the joint.

I have elsewhere, and especially in my Treatise on Military Surgery, preferred Larrey's amputation at the shoulder joint; but later experience has taught me that the method I have now described is, in several respects, to be preferred.

Summary of the Keys to the articulations of the upper extremities.—

1. Keys to the phalanges of the fingers. Either of the lateral ligaments.
2. Keys to the meta-carpo-phalangeal articulation of the thumb, great and ring fingers. Either of the lateral ligaments.
3. Key to the meta-carpo-phalangeal articulation of the index finger. Internal lateral ligament.

4. Key to the meta-carpo-phalangeal articulation of the little finger. External lateral ligament.

5. Key to the carpo-meta-carpal articulation of the thumb. Internal lateral ligament.

6. Key to the carpo-meta-carpal articulation of the little finger. External lateral ligament.

7. Key to the radio-carpal articulation (wrist joint). External lateral ligament.

8. Key to the humero-ulnar articulation (elbow joint). External lateral ligament.

9. Keys to the scapulo-humeral articulation (shoulder joint). First, coraco-humeral ligament. Second, supra and infra-spinatus and teres minor, near their insertion into the greater tuberosity. Third, subscapularis, near its insertion into the lesser tuberosity.

KEYS TO THE ARTICULATIONS OF THE LOWER EXTREMITIES:

1. PHALANGEAL ARTICULATIONS OF THE TOES. *Keys: The lateral ligaments.*—The phalangeal articulations of the feet have essentially the same anatomical structure as those of the hands, only that the bones are shorter, broader, and their articular surfaces are especially much more expanded. Owing to the general practice, also, of wearing narrow shoes, the joints are often deformed and their motions very much limited. The lateral ligaments, as in the case of the fingers, constitute the keys to the articulations, but they are not exposed and cut with the same facility as are the lateral ligaments of the fingers.

2. META-TARSO-PHALANGEAL ARTICULATIONS OF THE SECOND, THIRD AND FOURTH TOES.—In general, the same anatomical arrangements obtain here again, as in the corresponding phalanges of the hand, except that the joints are larger, more often deformed and partially anchylosed by lateral pressure. It will be noticed, also, that the toes cannot be flexed to a right angle with the dorsal surface of the foot at the meta-tarso-phalangeal articulation, as the fingers may be in a corresponding articulation of the hand, and consequently the joint cannot be exposed and opened so easily on the dorsal surface.

Either of the two *lateral ligaments* constitute the keys to these joints.

3. META-TARSO-PHALANGEAL ARTICULATION OF THE GREAT TOE.—*Key*: *External* (*fibular side*) *lateral ligament.*—The same argument applies to the use of the external lateral ligament as the key of this joint, as to the use of the external lateral ligament as the key to the meta-carpo-phalangeal articulation of the index finger.

4. META-TARSO-PHALANGEAL ARTICULATION OF THE LITTLE TOE.—*Key : External* (*radial side*) *lateral ligament.*—See meta-carpo-phalangeal articulations of index and little fingers.

5. TARSO-META-TARSAL ARTICULATION.—*Key : The flat dorsal ligament which unites the cuboid to the fifth meta-tarsal bone.* This is a complicated and irregular articulation, formed by the juxtaposition of nine bones. It is arthrodial in its character, its motions being limited almost entirely to the feeblest flexion and extension, and an equally slight sliding motion upon nearly plane surfaces. Its ligaments therefore which cover in the whole length of its dorsal surface are close and compact, and neither present in themselves any guides to the articulations, nor do they allow the joints to open sufficiently to indicate their positions.

No one would think of entering these articulations from the plantar surface, since in this direction they are peculiarly inaccessible, and the principal flap must be made from this surface.

On the tibial, or inner side, occasionally not much difficulty will be experienced in finding the point where the meta-tarsal bone of the great toe articulates with the cuneiform internum. In most cases, however, the articulation cannot be easily traced.

It is only from the outer, or fibular side that the surgeon may approach this difficult operation with an assurance of success ; employing as his guide the proximal end of the meta-tarsal bone of the little toe, which receives the insertion of the peroneus tertius and brevis. Lisfranc and Zeigler have seen the posterior tubercle of the meta-tarsal bone of the little toe, extending backwards toward the heel, half and three quarters of an inch; and it has been even found prolonged in this direction so as to articulate with the cuboid. In such a case the joint could not be entered from this point, except after first having sawn through the bone; but such abnormities are rare.

The mode of procedure in amputation at this articulation will be then as follows :—Commencing, in the case of the right foot, on the outer margin of the foot at the tarso-meta-tarsal articulation of the little toe, carry the knife across the dorsum of the foot in the line of a curve, with its convexity forwards, and terminate this incision a little in advance of the tarso-meta-tarsal articulation of the great toe, or the inner side of the foot. This latter articulation is, in adults, about three quarters of an inch farther forwards than the corresponding articulation of the little toe. Prolong the two extremities of the incision toward the heel, on the inner and outer margin of the foot about one inch, in order to expose the articulation more fully. This is especially necessary on the outer side, so that the "key" can be the more easily found. Dissect up the dorsal tegumentary flap, thus formed, a short distance, and cut the tendons only at the base of this flap. Place the knife upon the outer margin of the foot, a few lines posterior to the tubercle on the proximal end of the meta-tarsal bone of the little toe, and cut with firm pressure the tendons of the peronei, and the muscular bundle which forms the outer margin of the foot at this point. Now the "key," namely, the flat dorsal ligament, which connects the cuboid with the last meta-tarsal bone, will be fully exposed. It is not necessary that it should be seen and recognized, for it can be certainly cut by carrying the knife from this poin obliquely forwards, over the top of the foot, in the direction of a line which continued would traverse the meta-tarso-phalangeal articulation of the great toe. The entrance of the knife into the articulation will be facilitated by bending the meta-tarsal bone toward the sole of the foot. From this point the knife must be held a little less obliquely across the foot, dividing the dorsal ligament binding the cuboid to the fourth meta-tarsal bone; and if the end of the foot is flexed quite forcibly the knife will, in the same line, enter the joint between the cuneiform externum and the third meta-tarsal bone. The knife will here be arrested by the meta-tarsal bone of the second toe, as it is prolonged backwards between the external and internal cuneiform bones, like a tenon in its mortice. Its edge must, therefore, be directed backward towards the heel, and carried in this direction about two lines. The exact distance cannot be stated, since it varies in different persons, but great care must be taken not to carry the knife too far in this direction, lest it should enter the articulation between the middle and external cuneiform bones. The next step of the operation is always difficult, namely, to enter the joint formed by the second meta-tarsal bone and the cuneiform medium. It is indicated faintly by two very slightly elevated transverse ridges, covered by a flat, smooth, shining ligament. Between these ridges the ligament presents the appearance of a transverse white line, and this is the line of the articulation, into which the knife must be made to enter. Having traversed this articulation, the point of the knife must be thrust deeply between the inner (tibial) side of the second meta-tarsal and the outer side of the internal cuneiform bone—

the back of the knife being toward the heel of the foot—and by depressing the handle, the blade will divide, not only the dorsal but also the internal interosseous ligament, lying very deep toward the sole of the foot, and which is in reality the strongest ligament connected with the tarso-meta-tarsal articulation. The internal cuneiform bone is about half an inch longer than the middle cuneiform bone, consequently, the articulation of the first meta-tarsal bone with the cuneiform internum is about half an inch further forward than the articulation of the second meta-tarsal bone with the cuneiform medium. A knowledge of this fact will enable the surgeon to find without delay, the tarso-meta-tarsal articulation of the great toe, which he will recognize, also, by the slight epiphyseal elevation at the proximal end of the meta-tarsal bone. The line of direction of this articulation is slightly oblique, so that in following it to the tibial side of the foot, the knife will incline a little toward the heel.

It now only remains to complete the section of the remaining interosseous and plantar ligaments, and to construct the plantar flap from the tissues upon the sole of the foot. This flap which is alone to cover the end of the stump, must include nearly all the integument on the bottom of the foot as far forward as the interdigital commissure ; or at least to within one inch of this commissure. To insure also a proper size and form to the flap, it ought to be cut from the surface, and not from within out, as has been generally recommended.

I have thought it necessary to extend the description of this amputation beyond what might have been required to point out its key, because a knowledge of this alone will not enable the surgeon to make a speedy disarticulation, and because in some of the subsequent steps, as the careful student will observe, I have found it necessary to differ from the practice of Lisfranc, whose procedure had for a long time been accepted as the best which could be adopted. It will be especially noticed that I attach very little importance to the internal interosseous ligament, which Lisfranc regarded as the " key " to the articulation ; indeed it was from his use of the term in this connection that I have borrowed it, and given to it a more extended application. If this ligament must be considered the key to this joint, it has at least one great disadvantage. It is very difficult to find

6. MEDIO-TARSAL ARTICULATION.—*Key*:—This articulation is formed by the astragalus and calcaneum on the one hand, and the scaphoid and cuboid on the other. Its character is essentially enarthrodial, and its motions although limited are quite distinct in all directions. The ligaments which immediately embrace the articulations are therefore not so short and compact as those of the tarso-meta-tarsal articulation, and the joint may be easily entered with a knife from almost any point except perhaps the plantar surface. The principal difficulty which the surgeon experiences is in finding a reliable *guide* to the articulation. The measurements made from the malleoli and from other points vary so much in different subjects as to be wholly untrustworthy. The only guide which under nearly all circumstances can be relied upon is the inner (tibial) side of the scaphoid bone. This forms the only remarkable prominence on the inside of the foot below the ankle, and cannot be confounded with anything else, especially if we place the finger on this prominence and then alternately adduct and abduct the foot. We shall then observe that the only point of motion during this manipulation, is just above this prominence ; that is, between the scaphoid and the head of the astragalus. I have never found a subject so fat, or a limb so infiltrated with inflammatory effusions that this point of motion could not be distinctly defined, and that a knife could not be entered with certainty into the joint

There are no ligaments on the inside of the foot between the astragalus and the scaphoid, and but one thin feeble ligament above, namely, the superior astragalo-scaphoid.

Standing erect, the weight of the body falls to the inner side of the centre of the arch of the foot, consequently the foot is constantly inclined to be pressed or "splayed" outwards, and this would be its constant position, were it not for the powerful muscles whose tendons pass behind the malleolus internus, and for certain strong ligaments. These ligaments (for the muscles do not interest us in this connection) are the deep and superficial layers of the internal lateral or deltoid; belonging to the ankle joint. The deep layer passes from the apex of the malleolus internus directly to the astragalus. The superficial layer arises from the entire outer surface of the malleolus internus near its lower end, and is attached in a fan shape to the astragalus behind, to the calcaneum below, and by a broad flap, and firm band to the scaphoid in front. This latter fasciculus, namely that which attaches itself to the scaphoid bone, is the key to the joint.

The deltoid ligament is probably always ruptured in outward dislocations of the foot; and this will explain much better than Dupuytren's theory, the consequent and often permanent splaying of the foot outward. It is often strained in walking, in jumping, in dancing, &c., and in such cases the scaphoid seems to project unusually, or it becomes very tender in consequence of the inflammation developed in its periosteal coverings at or near the point of attachment of the injured ligament.

Operation of Amputation at the Medio-tarsal Articulation.—First step.— Seize the foot with the left hand (in the case of the left foot) and enter the bistoury over the centre of the tuberosity, or most projecting point of the scaphoid bone on the inner side, and carry it across in the line of a curve with its convexity forward, terminating the incision at a corresponding point on the opposite side of the foot. Dissect up the dorsal tegumentary flap a short distance and divide the external tendons, &c., at its base. Prolong the incision on the inside of the foot a little toward the heel, so as to uncover completely the key to the joint.

The object in making this first incision below the articulation, forming thus a short flap which requires afterward to be dissected up to the joint, is to insure a sufficient dorsal tegumentary covering; but the same end may be attained, whenever the skin is not rendered too tense by swelling, by another and much more expeditious procedure. Thus the foot being held at a right angle with the leg, while an assistant retracts forcibly the integument above the line of incision, the knife may be entered at once into the astragalo-scaphoid articulation on the inside of the foot, and from thence be carried directly across to a corresponding point on the outside.

Second step.—Carry the knife across the articulation, while the foot is forcibly depressed, dividing the remaining dorsal and the interosseous ligament. This latter has again been called the "key" to this articulation, solely, perhaps, because it is a strong and somewhat inaccessible ligament, and its section is demanded before the articulation can be freely opened; but it is never divided in the first steps of the incision into the joint, and it cannot be considered, therefore, as the key of the joint in the sense in which I have employed the term. It is not situated at the gate or entrance to the articulation.

Having traversed the astragalo-scaphoid portion of the articulation, if the foot remains at a right angle with the leg, the knife will readily enter and pass through the calcaneo-cuboid portion nearly in the same line in which it has hitherto been carried. But in general it is found more convenient to depress the foot in order to open the joint more freely, and in doing so the calcaneum is made to project a little forward, and the edge of the knife must be inclined forward and carried through to the sole of the *foot in this direction.*

The plantar flap must be very long, and great care must be taken that it has sufficient breadth at its base. In order to secure this latter end, it ought always to be made by cutting from the surface, and not from within out.

In the description which I have given of this amputation, I do not claim that I have modified materially the original plan of Chopart, but I have sought especially to throw some additional light upon the most important point, namely the manner of entering the joint. I do not esteem the operation very highly, and from all that I have seen of its results, I am not disposed to recommend it, unless it may be in some very rare and exceptional cases. I may say, indeed, that it is about the only amputation which I have never yet made upon the living subject.

7. TIBIO-TARSAL (ANKLE JOINT) ARTICULATION.—*Key: Internal lateral or deltoid ligament.*—The tibio-tarsal articulation is ginglymoid. It admits of no lateral motion; the astragalus being compactly wedged between the two malleoli. The external malleolus is longer than the internal The articulation is supported and its luxation prevented by its capsule, its ligaments, the two malleoli and the tendons and muscles which pass to the foot. Its capsule forms the most inconsiderable portion of this support. The muscles and tendons have their origin and attachments too remote to be of much service in this regard; except that the two strong tendons passing through the groove immediately behind the malleolus, when in action, contribute materially to the prevention of a luxation of the foot outward. The two malleoli are very important supports to the joint, and this is especially true of the outer malleolus. There is no posterior ligament to the articulation. The anterior ligament is broad, long and thin. The external lateral ligament is composed of three rather narrow and not remarkably strong fasciculi. Finally, the internal lateral ligament, (deltoid), which I have already described, particularly in connection with the medio-tarsal articulation, is broad and strong and constitutes the chief support of this articulation.

This ligament is, therefore, properly the key to this articulation, quite as much as to the medio-tarsal articulation; and not only because it is the strongest ligament, or that which most especially retains the bones in place, but also because owing to the relative shortness of the malleolus internus, it is more accessible than the external lateral ligament; and being composed at its origin of one continuous bundle of fibres, while the external lateral originates at three distinct points of the malleolus, it can for this reason be more easily divided. It has an advantage over the external ligament, moreover, in the fact that the malleolus internus being shorter, a section of the internal ligament, near its origin, enables the surgeon to carry the knife more easily to the top of the astragalus, and thus to complete the disarticulation.

The following is the method which I have preferred in this amputation:

First Step.—The foot being held in a position of extreme extension, the point of the bistoury is introduced half an inch below the centre of the lower end of the malleolus internus (in the case of the left foot), and from thence it is carried over the top of the foot, in the line of a curve having a slight convexity downward, to the anterior margin of the lower end of the malleolus externus. The object in commencing this incision half an inch below the malleolus internus is to preserve the symmetry of the transverse incision; and by terminating the incision, also, a little further forward, to secure so much additional width to the base of the posterior or plantar flap. Upon the inner side, I prefer to carry the incision farther back, that I may expose the deltoid ligament more freely to the knife. The knife, while traversing the top of the foot, may be pressed sufficiently firmly to divide the tendons and all the tissues down to the bone, including the anterior ligament and the capsule.

Second Step.—The leg being elevated and the foot flexed to a right angle with the leg, the bistoury may be placed firmly upon the point where the first incision commenced, and from thence be carried across the bottom of the foot and made to terminate where the first incision ended upon the outside of the foot, cutting to the bone along the whole length of this incision. The line of this second incision ought not to fall vertically from the malleoli; that is to say, not at a right angle with the sole of the foot. This would give a redundancy of flap; it would increase the danger from sloughing, and render its detachment from the calcaneum more difficult. It is better to carry the lines of incision from the two malleoli a little backwards, so that the knife will cross the bottom of the heel about one inch and a half farther back; and in the case of an unusually long heel it will be proper to carry the incision backward two inches, and possibly in some cases even more than two inches from the vertical line.

Third Step.—Expose the end of the malleolus internus fully, and introduce a strong, sharp bistoury half an inch below the malleolus, with the edge directed outwards toward the bone, and a little inclined upwards toward the lower end of the tibia, being careful not to project its point so far as to wound the posterior tibial artery, and then while the foot is forcibly abducted, cut firmly and with a slight sawing motion. This will sever the deltoid ligament and open the joint freely.

Fourth Step.—The practice has been hitherto—in pursuance, I think, of the advice of Mr. Syme—to separate the lower flap from the calcaneum by dissecting from the bottom of the foot; a method of procedure which I have found tedious and difficult. I prefer very much to make this dissection from above. Putting the foot again into a position of extreme extension, the knife will divide the external lateral ligaments, and by forcing the foot down, the joint will be easily entered and the dissection continued backwards over the top of the calcaneum toward the tendo Achilles. The operator will find it necessary to discontinue occasionally the backward dissection, and to loosen, alternately on the right and on the left, the attachments of the integuments to the sides of the calcaneum, using great care now that by keeping close to the bone behind the malleolus internus, he does not wound the posterior tibial artery before it has given off the internal calcanean arteries. These arteries supply the integument and cellulo-adipose tissue which compose the posterior flap. Division of the posterior tibial at a point lower than this does not, as has been affirmed by others, endanger the vitality of the flap, inasmuch as the flap receives no arterial supply from lower source. Caution must also be used in dissecting backwards over the top of the heel bone, especially where the tendo Achilles is attached, to hug the bone closely, and thus to avoid all danger of opening through the integument.

Fifth Step.—Expose the two malleoli thoroughly, and saw them off on a level with the lower articular surface of the tibia, using great care again not to wound with the saw the posterior tibial artery. It is not necessary, nor is it useful, to remove any portion of the lower articular surface of the tibia, unless it is diseased.

If, after securing the arteries, any of the tendons are found projecting very much, or if they have been lacerated, cut them off close to the point where they emerge from their sheaths; but do not, for this purpose, draw them down forcibly. In retracting, their divided ends are carried up, and the danger of suppurative inflammation in the synovial canal is increased.

I have not found it necessary to establish an opening through the flap to secure drainage, but if this were deemed necessary, it ought to be made on the back of the stump, just opposite the point where the tendo Achillis was attached and where the tegumentary covering is the thinnest. A small, vertical slit at this point might be harmless. An *opening through* the thick integument of the middle of the flap is not sufficiently depending for drainage when the patient lies in bed, and leaves a sensitive cicatrix in parts which are destined to support the weight of the body.

It seems to me proper to add in this connection that in all amputations of the leg at a point below its upper third, and requiring the employment of a tourniquet, I have been able to diminsh the loss of blood by applying this instrument to the popliteal artery rather than to the femoral. My practice is to construct a pad composed of a cotton roller folded upon itself, so that it shall be three inches wide by four inches in length, and about two and a half inches in thickness. This is placed lengthwise in the upper half of the popliteal space, and the strap is buckled over the outer part of this pad and across the thigh just above the patella. The frame of the tourniquet should be on the front of the thigh underlaid with a few folds of bandage to prevent its injuring the skin. This will secure the artery perfectly and leave the motion of the leg unembarrassed.

7. KNEE JOINT ARTICULATION.—*Keys: Internal lateral and accessory ligaments.*—The great size of this ginglymoid articulation, its great latitude of motion, its lack of either bony or muscular support in the direction of its circumference—together with the fact that it is destined to sustain the whole weight of the body, demand stronger ligaments and a more complicated arrangement of their fasciculi, than are required in any other articulation. Nevertheless the thinness of its exterior coverings, and the large size of its various anatomical parts, render it easy to determine the position of its articular surfaces, and to accomplish its disarticulation with the knife.

There exists, therefore, no very special necessity for determining what should be considered the key to the joint, since the most inexperienced surgeon would scarcely fail whatever mode of approach he might accept. It is rather then for the purpose of rendering complete this series of observations, and because I have some useful suggestions to make in relation to the details of the procedure, that this description is undertaken.

The posterior ligament (of Winslow) is composed of broad, firm and decussant fasciculi, which cover in the whole back of the joint and embrace it closely. The anterior ligament is the ligamentum patellæ, broad and strong, but resting loosely over the articulation except when under the control of the quadriceps femoris. Its division does not, therefore, facilitate the separation of the joint surfaces except as it opens the way to other ligaments. The external lateral ligament is composed of two distinct fasciculi, both of which, arising from the outer tuberosity of the femur back of the centre of the joint are inserted into the head of the fibula. It is attached to and reinforces the capsule. The internal lateral ligament is composed of a single strong fasciculus, and is placed also nearer the posterior than the anterior face of the knee. It arises from the internal tuberosity of the femur and is inserted into the inner tuberosity and inner side of the shaft of the tibia. Its posterior portion is stronger than its anterior portion. The capsular ligament is thin but strong, being reinforced by fibrous bands from the fascia lata and from the vasti; but especially on the inner side does it receive increased support from these sources, insomuch that these broad and expanded fasciculi have been denominated the *ligamentum accessorius.*

It will be observed now that a section of the internal lateral ligament alone will not open the joint, nor will a section of the accessory ligament and capsule alone open the joint, but a section of both, including, of course, the capsule, will open it freely. In these conjoined ligaments then we find the key of the articulation.

The crucial ligaments, anterior and posterior, are situated in the interior of the articulation, back of the centre and are not reached until the disarticulation is more than half completed.

Mode of Procedure in Amputation at the Knee Joint.—First Step.—The leg being flexed to a right angle with the thigh, make an oval segumentary incision around the upper portion of the leg in accordance with the following rule: Lay the upper face of the knife (single-edged amputating knife, with six or seven inch blade), flat against the lower surface of both hamstrings, with its edge directed toward the back of the leg; and from this point proceed forwards crossing the front of the leg about four inches below the patella, that is, about one inch below the anterior tuberosity of the tibia, and terminate the incision at the point of beginning behind the knee. In case of a large limb it may be necessary to drop the line of incision one or even two inches lower in the front, so as increase the length of the anterior flap.

Second Step.—Dissect up the integuments, including all the fat and areolar tissue, and in thin patients including even the sub-tegumentary fascia; expose the lower margin of the patella, and divide the ligamentum patellæ as near the patella as possible. Having entered the joint carry the knife inwards dividing in one continuous incision the capsule with its accessory ligament, the internal lateral ligament and the internal hamstrings. Then divide in the same manner the outer half of the capsule, the external lateral ligaments and the outer hamstrings. The interarticular cartilages must remain attached to the tibia.

Third Step.—Direct the assistant to flex the leg upon the thigh as far as possible, so as to bring into view the crucial ligaments. Divide these ligaments with the point of the knife, and cut slightly the posterior ligaments (of Winslow.)

Fourth Step.—Direct the assistant to place one hand behind the knee and to draw the upper part of the leg forward so as to open the joint posteriorly.

Introduce the blade of the knife behind the head of the tibia, with its edge directed downwards in the plane of the shaft of the tibia, carry it in this direction two inches, then turn the edge directly backwards toward the back of the leg and cut out.

If the knife is made to pass directly through the soft parts, posteriorly in the direction of the articular surfaces, the popliteal artery will be so drawn up and concealed in the upper angle of the wound that it will be difficult to seize it. Moreover, the directions which I have given for reaching the first incision, and which are necessary to insure a sufficient covering, imply the existence of a short posterior flap, the commencement of the oval incision, on the back of the leg, below the hamstrings, being at least two inches below the head of the tibia.

The question whether the patella shall be removed in this amputation has been much discussed. The advantages in not removing the patella consists solely in the fact that the quadriceps acts with more power when it is retained. On the other hand, in consequence of being retained, the anterior flap must be from one to two inches longer; and this is rendered necessary for two reasons, first, because of the additional surfaces required to be covered, and second, because the quadriceps retains its full power to act upon the tegumentary flap and to displace it upwards.

If the patient is in good health and the integuments which are to compose the flaps are thick, vascular and in no way injured or diseased, and if the end of the femur is not very large, it may be proper to leave the patella in place; but if opposite conditions obtain, or if the flaps having been formed, it is found that they do not close easily and without force over the end of the femur, then the patella should be removed.

In removing the patella the surgeon needs to exercise some care to keep close to the bone, and not to remove or wound any portion of the adjacent soft parts. Experience has shown that it is not necessary to excise the cartilage of incrustation. It undergoes, after exposure, rapidly certain pathological changes, and the flaps unite to exposed articular surfaces almost as *speedily* as union is known to occur in other wounds.

It only remains to tie the popliteal artery, and to close the wound by laying the long anterior flap over the end of the stump and securing it in place.

It will be observed than I have described, in so far as the form of the first incision is concerned, the oval operation of Baudens; but I have modified all the incisions in several points; and I have also attempted to render its description more precise than has been done, so far as I have been able to ascertain, in any of the treatises which profess to describe Baudens' method; without which precision, however, the results are likely to be very unfortunate, or at least unsatisfactory.

8. HIP JOINT (COXO-FEMORAL)—*Key*: *Anterior portion of capsular ligament.* The coxo-femoral articulation is enarthrodial—ball and socket—but its range of motion is considerably less than that of the shoulder joint, owing to the greater depth of its socket and to the fact that its capsular ligament, especially in front, has less relative length, or redundancy. In fact while the head of the humerus is retained in position chiefly by its surrounding muscles with their movable tendons, the head of the femur is retained in place exclusively by the elevated margins of the acetabulum and by its ligaments; to which may be added, the force of atmospheric pressure.

The round ligament seems rather designed to convey nourishment to the head of the bone, than to bind the adjacent bones to each other; certainly its function as a ligament is very limited, since it is capable of restraining the motions of the femur only in the extremes of adduction and abduction, and of its various other positions.

The capsular ligament arises from the outer margin of the acetabulum, and from the transverse ligament,and from thence extending downwards over the head and neck, it is inserted anteriorly along the anterior inter-trochanteric line, and posteriorly it is inserted upon the neck of the femur a short distance from the posterior inter-trochanteric line. It is thick and strong, especially above and in front where it is subjected to the greatest strain and pressure.

The ilio-femoral ligament is a strong band of fibres arising from the anterior inferior spinous process of the ilium, and which, as it descends obliquely forwards and downwards across the head and neck of the .emur attaches itself to the outer surface of the capsular ligament, and finally to the anterior inter-trochanteric line near the trochanter minor. It is, therefore, an accessory ligament to the capsular, designed to reinforce its anterior and inner wall.

If the anterior and internal portion of the capsule be cut, together with the ilio-femoral ligament, and the thigh be forcibly abducted and thrown backwards, a dislocation is effected with great ease. These jointly constitute, therefore, the key to the joint.

Method of Amputation.—A majority of practical surgeons have, I think, given the preference to some form of the anterior flap amputation. It is preferred by Guerin and Malgaigne, and during the late war most of our surgeous have adopted this method in some of its modifications. Few surgeous, however, have ever made a sufficient number of hip-joint amputations upon the living subject, to have determined in this manner the relative merits of the different modes which have been recommended. In the single amputation at the hip-joint upon the living subject which I have had occasion to make, for special reasons, a different method was chosen. Our appreciation of the different procedures must, therefore, be founded upon experiments made upon the cadaver; of this source of information I have availed myself; and, after having practiced all the plans recommended, many times, I have fully adopted the following modification of the anterior flap operation:

First Step.—Supposing it to be the left limb which is to be amputated, the patient is placed upon his back, with the nates resting over the lower end of the table, and at the corner of the table, on the side corresponding to the left side of the patient.

The thigh is then slightly elevated, (flexed), adducted moderately, and gently rotated inwards—this position having the effect of rendering the head of the femur less prominent, and, at the same time of carrying the femoral vessels and the anterior crural nerve more forwards, so that the point of the knife can more securely pass between the head of the bone and the vessels.

The femoral artery being compressed by an assistant as it passes over the brim of the pelvis, the operator holding in his right hand a straight, single-edged amputating knife, having a twelve or fourteen inch blade, introduces its point just above, and one inch in front of the trochanter major. The edge of the knife being directed downwards, in the line of the axis of the limb. From this point the knife is made to penetrate transversely, and with a slight inclination backwards, so as to strike the head of the femur in its upper half and near the upper margin of the acetabulum. By inclining the point, also, as directed, a little backwards, the head of the femur will be struck rather upon its outer aspect, and not upon its most prominent and anterior aspect. The point of the knife having now entered the capsule, and penetrated slightly the head of the femur, will be arrested. The handle of the knife being now raised toward the head of the patient, the point will descend over the head to the neck, cutting the capsule as it descends.

Pressing the knife now across the limb, it will penetrate in front of the neck, under the anterior portion of its capsule. Then elevating the handle of the knife in the direction forwards, as much as the skin and fascia lata will permit, and at the same time inclining the handle toward the head of the patient, the point, under steady pressure, will continue to descend under the ilio-femoral ligament, and the conjoined tendon of the psoas magnus and iliacus internus, and finally emerge well back and below the tuberosity of the ischium.

With a sawing motion of the knife the surgeon enlarges the incision downwards along the front of the trochanter major and neck, until sufficient space is made to allow a second assistant to introduce the four fingers of each hand into the anterior and posterior wounds and to seize the femoral vessels between his thumbs and fingers. The first assistant pressing upon the vessels over the brim of the pelvis, must not withdraw his pressure, until the second assistant has satisfied himself that he has the vessels in his grasp. The surgeon then rapidly completes the section of the anterior flap, raising the edge of his knife a little to overcome the elevation of the trochanter minor, and carrying it down close to the shaft of the femur far enough to make a flap of from five to seven inches in length—more or less, according to the diameter of the limb, and finally bringing the edge of the knife to the surface obliquely.

Second Step.—An assistant grasping the knee and leg rotates the thigh outwards, while he forcibly abducts and carries it backwards over the corner of the table and toward the floor.

If in the first step of the operation, the point of the knife has struck skillfully the capsule covering the head of the bone, the disarticulation may be accomplished by the manœuvre just described. In other cases it will be necessary for the surgeon to apply the knife to the capsule, and for this purpose a large scalpel is the most convenient—dividing the capsule first transversely over the most projecting portion of the head, and then longitudinally in the direction of the axis of the neck, and extending this last incision well down upon the neck. The round ligament, if not already torn, is then to be cut.

Third Step.—The disarticulation being effected, the centre of the amputating knife is to be passed above the head of the bone, and the section of the parts posterior to the articulation completed by a sawing motion, the knife being made to emerge below in the gluteal fold.

The arteries having been secured, the large anterior flap is permitted to fall back, and is made fast with sutures and adhesive strips, the whole being secured by the roller.

Remarks.—If time is no element of consideration, no doubt the operation might be made with some less chance of hæmorrhage, by securing the femoral artery, just below Poupart's ligament, before commencing the amputation, as recommended by Valentine Mott, Delpech, Blandin, and others. Larrey advised to tie both the artery and vein; or it might be proper to apply to one or both of these vessels a ligature of reserve, which could be removed when the operation was completed.

The instructions given by Fergusson, and others, to introduce the point of the knife "about midway between the trochanter major and the anterior superior spinous process of the ilium, keeping it rather nearer the latter than the former," and then "run it across" in general, is unsafe. The point of the knife is in danger of passing above the head of the femur,and even of penetrating the belly and wounding the iliac artery and vein; and especially if we add to this error in introducing the knife the instructions given by Guerin to carry the point of the knife a little upwards. This accident has actually happened with me in making the amputation upon the cadaver, according to the rule given by Guerin. It will be seen, therefore, that I have modified this step of the operation. Certainly it may be awkward to dislocate the head if the operator strikes the capsular ligament too low, but of the two evils this is much the least.

In the final incision, if we cut from without, that is, from the surface, holding the point of the knife at first directed perpendicularly upwards between the thighs, it is very inconvenient to bring it downwards and outwards so as to sweep well around the thigh, on account of the proximity of the opposite thigh; and the operator is obliged, generally, to apply the knife two or three times to complete the section. All of this embarrassment is avoided when this incision is commenced, as I have directed, from above the dislocated bone; but greater care has now to be exercised in completing the section, that the knife falls exactly into the gluteal fold, and neither above nor below this point.—FRANK H. HAMILTON.

JOINTS, Neuromimesis, or Hysteria of.—*Diagnosis* from "organic" disease is based on the facts that, in neuromimesis, (1) the subjective spmptoms, pain, tenderness, etc., are often great while there is in the joint no alteration visible to the surgeon at all; (2) the pain and tenderness are often chiefly in the skin rather than in the joint itself; (3) the patient sometimes describes her sufferings in strong language, but in a cheerful manner, as though the recollection of them was not so very painful after all; (4) stiffness and contractions disappear under anæsthetics; (5) instead of being hotter than the healthy joint, as in the case of inflammations, the affected joint is often colder; (6) other hysterical symptoms, and even a manifest cause for them, may coexist. But bear in mind that hysterical patients are not exempt from organic disease, and that "hysteria" itself even sometimes leads to actual alterations in the joints. This is not surprising, considering the intimate relations, pathologically as well as physiologically, between the spinal chord and the joints.

Treatment.—See Hysteria. Refer to Paget's Clin.—C. B. KEETLEY.

KELOID—*See Cheloid.*

KELOID, Addison's—*See Morphœa.*

KERATITIS—*See Cornea, Diseases of.*

KERION—*See Tinea.*

KIDNEY, Abscess of—*See Kidney, Suppurative.*

KIDNEY, Calculus in—*See Calculus.*

KIDNEY, Cancer of—*See Kidney, Rare Diseases of.*

KIDNEY, Congestion of.—*Etiology.*—Congestion of the kidneys may be active or mechanical. Active renal congestion, also named catarrhal nephritis, may result from: 1. Any pyrexial condition, but especially that accompanying the exanthemata. 2. Exposure to cold and wet. 3. The use of certain medicines in excess, viz., cantharides, turpentine, nitre, cubebs, or copaiba. 4. Irritating urine in connection with diabetes. 5. Morbid formations in the kidney, or emboli. 6. The early stage of inflammation. 7. It is said hypertrophy of the left ventricle; or, possibly, active dilatation of the vessels, as in cases of hysteria. Mechanical hyperæmia is a common consequence of: 1. Some cardiac or pulmonary disease interfering with the general venous circulation. 2. Pressure upon one or both renal veins, or upon the inferior vena cava above their point of junction, by an abdominal tumor or a pregnant uterus.

Anatomical characters.—At first the kidneys present the characters ordinarily accompanying congestion, viz., enlargement and increase in weight, increased redness, with points of vascularity, especially corresponding to the Malpighian bodies, and sometimes minute ecchymoses. In many forms of active hyperæmia there is a catarrhal state of the ducts of the pyramids, with shedding of their epithelium. After mechanical congestion has lasted for some time, the usual pathological changes are set up, leading ultimately to grave disorganization of the kidneys, these organs becoming contracted, indurated, and sometimes granular or irregular, while their cortical substance undergoes more or less atrophy. Microscopic examination reveals alteration in the shape of the tubes, with thickening of their walls; changes in the epithelium, which is often destroyed; increase in the intertubular connective tissue, and permanent distension of the minute vessels. By some authorities this condition is looked upon as a form of Bright's disease.

Emboli not unfrequently lodge in the kidneys, and give rise to infarctions, which are almost invariably confined to the cortical portion, differ in size, and are usually well-defined and wedge-shaped, with the base towards the surface. At first they present a dark-red color, but become decolorized from the center towards the circumference, leaving yellow masses, which may be ultimately absorbed, depressed cicatrices alone remaining. Rarely an infarction softens and breaks down, forming a pseudo-abscess, or it is said that even actual pus may be produced.

Symptoms.—Congestion of the kidneys is ordinarily indicated by the urine becoming diminished in quantity, high-colored, and concentrated, and depositing urates abundantly on standing; while it afterwards contains some albumen, occasionally a little blood or clear, fibrinous casts, with a few renal epithelium cells. In some forms of active hyperæmia, however, a copious flow of pale and watery urine takes place, which is of low specific gravity. There may be a sense of fulness about the loins, or even a certain degree of heavy pain, and tenderness is frequently complained of. If the congestion subsides, the urine assumes its normal characters; but if it continues and leads to organic changes in the kidneys, this fluid presents more marked and permanent changes, which will be hereafter considered. As a rule, there are no symptoms indicative of renal embolism. If the embolus is large, its lodgment may cause a sudden severe pain in the renal region, shooting towards the pelvis, followed by albuminaria or hæmaturia. Should an abscess form in the kidney after embolism, symptoms indicative of this event might set in.

Treatment.—If renal congestion calls for any positive interference, the main indication is to remove or mitigate its cause as soon as possible, especially in the mechanical form. Rest in the recumbent posture; free dry cupping, or the application of heat and moisture over the loins, or in some cases the removal of a little blood from this region; the use of the warm bath; and active purgation, are the chief direct remedies to be employed.—FREDERICK T. ROBERTS.

KIDNEY, Dropsy of—*See Kidney, Rare Diseases of.*

KIDNEY, Movable or Floating.—Normally the kidneys are nearly fixed, but occasionally one or both, especially the right, are displaced, and become more or less freely mobile, floating about in the cavity of the abdomen. This condition has been by far the most frequently observed in females, chiefly after repeated or difficult parturition. It has also been attributed to congenital looseness of the attachments of the kidney, sudden or repeated violent effort, pressure by tight-lacing, rapid absorption of the renal investing adipose tissue in fat people, increase of the weight of the kidney during the menstrual periods, resulting from congestion with a consequent tendency to gravitation downwards, or to this organ being dragged down by a hernia. The movable kidney is felt as a tumor, having the exact form and feel of the healthy organ, and usually lying when the patient stands erect in an oblique position, directed upwards and outwards, about midway between the margin of the thorax and the umbilicus. It is mobile in different directions by change of posture, manipulation and respiratory movements. In some cases the organ may be grasped in the hand, thus causing the patient to experience a peculiar sickening sensation. Percussion generally yields a muffled tympanitic sound. On examining the corresponding lumbar region, it will be found flattened or depressed, as well as tympanitic on percussion, owing to the absence of the kidney. In some instances the displaced organ becomes enlarged and painful from time to time, this eveut being attributed to pressure on its own duct, leading to retention of urine and consequent inflammation. As a result of repeated attacks of this kind the kidney may become permanently fixed by adhesions. Among the most frequent symptoms accompanying the floating kidney are mentioned a sense of uneasiness or dragging pain, increased by walking or standing; neuralgic pains, disturbances of the alimentary canal, and other orders due to compression or irritation. The urine is generally normal, but micturition may be frequent or painful. During the inflammatory attacks severe symptoms may be experienced.—FREDERICK T. ROBERTS

KIDNEY, Parasitic Disease of—*See Kidney, Rare Diseases of.*

KIDNEY, Rare Diseases of.—I. CANCEROUS AND OTHER GROWTHS. —Of rare occurrence, renal cancer may be primary or secondary. It is most frequent in very young children, or after adult age, and in males. The variety met with is almost invariably encephaloid. The deposit is always in the nodular form when secondary, but when primary it may be either nodular or infiltrated. Secondary cancer does not attain any large size, but primary cancer frequently grows to enormous dimensions, usually giving rise to an irregular tumor. The consistence varies considerably, being sometimes very soft and almost fluctuating, while it is rarely uniform throughout. Hæmorrhage, softening, degeneration, and suppuration are liable to occur in the growth. The uninvolved renal texture is generally atrophied from pressure, or otherwise altered. Thickening of the capsule and adhesions to neighboring parts are generally observed, while adjoining structures are frequently displaced or destroyed by pressure, the colon always lying in front of the tumor. The pelvis of the kidney and the ureter are often involved. In the great majority of cases only one kidney is affected. Secondary deposits are common, especially in the neighboring glands.

Symptoms.—The important clinical signs of renal cancer are severe pain in the lumbar region, generally shooting towards the hypochondrium and thigh or in some other direction, and subject to remissions or intermissions; tenderness; hæmaturia, in many cases profuse and irregularly intermittent, occurring without any obvious cause; and the presence of a renal tumor, the special characters of which are the rapidity of its growth, and the great size which it may attain, especially in children, its absolute immobility, as a rule its irregularly lobular feel, and its more or less firm though unequal consistence. Occasionally there is an obscure sense of fluctuation over some parts of it. In some cases the superficial veins over the tumor are much enlarged, and it has been known to present pulsation. Symptoms may arise from the pressure of the growth on surrounding structures. The detection of cancer-cells in the urine has been considered important, but several excellent observers doubt the possibility of recognizing these structures. Marked emaciation and debility, with signs of the cancerous cachexia, are frequently observed, and there may be evidences of cancer in other parts of the body. The course of the disease is very rapid in children, but comparatively chronic in adults.

Of the non-malignant growths very exceptionally found in the kidneys may be mentioned osseous tumors, fibromata, sarcomata, lipomata, enchondromata, lymphatic or glandular growths, and syphilitic gummata. Some of these may form an evident tumor.

II. Tubercle.—There are three classes of cases in which tubercle is found in connection with the renal apparatus, viz.: 1. As a part of acute miliary tuberculosis, the kidneys being studded with gray granulations. 2. Secondary to tubercular disease in the lungs or other organs, when it does not usually give rise to any local symptoms. 3. As a primary formation, generally involving the kidneys, their pelves and ureters, the bladder, and sometimes the urethra, and being not uncommonly followed in the male by deposits in the prostate gland, testes, or vesiculæ seminales. The last constitutes much the most important group of cases. In the kidneys tubercle is seen at first in the form of gray or yellow nodules, occupying the cortex, which afterwards coalesce, become caseous, and break down, forming irregular abscess-like cavities, which burst into the urinary passages, discharging disintegrated tuberculous matter and pus. Generally both kindeys are implicated, and they are frequently extensively or completely destroyed. In the pelvis and ureters the growth starts in the submucous tissue, where it forms granules, and ultimately inflammation of the overlying membrane is excited, ending often in extensive ulceration and destruction. Occasionally one ureter becomes completely rigid, and its canal is blocked up, leading to pyonephrosis.

Symptoms.—During the early period primary renal tuberculosis may be indicated by a dull pain in the region of the kidneys, with frequent micturition. The important symptoms, however, are those of chronic pyelitis or pyonephrosis, often associated with symptoms of cystitis; great wasting, debility, and hectic fever; and in time signs of implication of the lungs, intestines, or other organs. The urine is almost always deficient, slightly acid, and contains abundance of pus, frequently a little blood, but not in any large quantity, extra-renal epithelium cells, much granular detritus, and in some cases connective tissue or elastic fibres. If the ureter is blocked up, a painful fluctuating tumor forms in the corresponding renal region, which may subside with coincident appearance of much pus in the urine should the obstruction be removed. Uræmia is liable to arise if both kidneys are affected.

III. PARASITIC GROWTHS.—1. Occasionally one kidney, especially the left, is the seat of a hydatid tumor, which may ultimately attain a great size. It tends to burst into the renal passage, its contents escaping with the urine; very rarely it opens in some other direction; or it may undergo any of the changes to which hydatid cysts are liable.

Symptoms.—There may be none throughout. The most prominent sign of hydatid disease of the kidney is the existence of a renal tumor, rounded in form, though often somewhat irregular and lobulated, having an elastic or more or less fluctuating feel, and occasionally yielding hydatid fremitus. As a rule there are no renal symptoms. Should the cyst burst into the urinary passages, important symptoms generally arise, namely, those of one or, more commonly, of several intermittent attacks of nephritic colic, due to the escape of the vesicles by the ureters, preceded by a sharp pain in the renal region, and occasionally by a sense of something having burst, and followed by signs of the passage of the hydatids along the urethra, that is, by great pain to the end of the penis, and constant desire to pass urine, with more or less retention, and finally by the appearance of the vesicles or their remains in the urine, frequently accompanied by some blood or pus. Occasionally a cyst blocks up the ureter, and thus leads to hydronephrosis. Inflammatory symptoms arise should the tumor become inflamed, or various symptoms may occur from its bursting in different directions.

2. The cysticercus cellulosus has been found in the kidneys.

3. The following entozoa are met with occasionally: *a.* Bilharzia hæmatobia. This worm is found in some other structures, but it is most injurious in connection with the bladder, ureter, and pelvis of the kidney, being deposited in the minute veins of the mucous membrane lining these parts. It belongs to the trematoda, being about three or four lines long, of soft texture, and bisexual. The morbid effects which it may occasion are hæmaturia, it being, as previously stated, regarded as the cause of the endemic hæmaturia of certain hot countries; the formation of raised, injected, and ecchymotic patches in the mucous membrane; local inflammation ending in suppuration; obstruction of the ureters, with consequent hydronephrosis or pyonephrosis; and the formation of calculi, owing to the masses of ova forming a nucleus for urinary deposits. *b.* Strongylus gigas. This is a nematoid worm, resembling in general characters the ascaris lumbricoides, but being much larger, having a reddish color, and presenting six nodular papillæ about the mouth. It is found in the kidney and urinary passages, and necessarily tends to give rise to considerable disturbance, but of no definite character. *c.* Pentastoma denticulatum. Supposed to be the larva of a worm, this appears as a very minute encysted parasite, one and a half lines long, club-shaped, with a double pair of hooks, and devoid of sexual organs.

IV. CYSTIC DISEASES.—Dr. William Roberts describes the following varieties of cysts which may be met with in connection with the kidney: 1. Scattered cysts in kidneys otherwise healthy, which now and then attain a great size, so as to form a fluctuating tumor. 2. Disseminated cysts in the atrophic form of Bright's disease. 3. Congenital cystic degeneration. 4. General cystic degeneration in adults. The last affects both organs, but to different degrees. They become much enlarged, and are converted into a mass of closely aggregated but distinct cysts, lodged in an abundant matrix of connective tissue, varying much in size, and containing either a limpid yellowish or reddish serum, or a gelatinous substance, this yielding albumen but not urinary ingredients; subsequently other materials are often added. The renal tissue is partially or almost completely destroyed. *The cysts do not as a rule open into the pelvis, which, with the ureter and bladder, is usually quite healthy.* As to the origin of these cysts, they have been attributed to dilatation of the Malpighian capsules, or to distension of limited portions of the tubules which have been obstructed at each end. During life this condition may give rise to a tumor, which is sometimes extremely large. The urine is occasionally increased in quantity, and is generally of low specific gravity. The fatal termination is often preceded by uræmic symptoms.

V. DROPSY OF THE KIDNEY.—Hydronephrosis may result from any permanent closure of the ureter. It is frequently congenital, but may arise subsequently from impaction of a calculus or other body in the ureter; organic changes in its walls leading to stricture, such as ulceration followed by cicatrization; or external pressure upon it by a tumor. As the result of this obstruction, the pelvis and the portion of the ureter above the impediment becomes dilated from accumulation of urine; this subsequently causes flattening of the papillæ, and gradual compression and atrophy of the pyramids of the kidney, followed by wasting of the cortex, with distension of the capsule, until ultimately nothing may be left but a membranous sac containing fluid, either single or divided into chambers, and sometimes attaining an enormous size. The fluid consists usually of altered urine, this being much more watery than the normal secretion, almost always a little albuminous, and sometimes presenting an admixture of blood, pus, or epithelium. As a rule only one kidney is affected, while the healthy organ becomes hypertrophied.

Symptoms.—Evidence of some cause likely to give rise to obstruction of the ureter may help in the recognition of hypronephrosis. The only positive sign, however, is the development of a painless, soft, and more or less fluctuating renal tumor, which sometimes feels lobulated, unaccompanied with any unusual characters of the urine. Occasionally the obstruction is removed, and the tumor suddenly subsides, the copious discharge of urine which is highly characteristic; the sac may afterwards shrivel up. It may be necessary for diagnostic purposes to use an exploratory trocar or the aspirator. The tumor may occasion symptoms by pressing on surrounding structures. It is a curious fact that in cases of double hydronephrosis uræmic symptoms do not arise for a considerable time. Most cases ultimately terminate fatally in various ways. In extremely rare instances the sac ruptures spontaneously.

General Diagnosis, Prognosis, and Treatment.—1. *Diagnosis.*—In most of the rare affections just considered, the chief matter in diagnosis is to determine the nature of a tumor in the renal region. It will be well, therefore, to enumerate all the conditions to which such a tumor might be due, and they include renal abscess, pyonephrosis, perinephritis, cancer or a non-malignant growth, hydatid disease, hydronephrosis, or cystic degeneration of the kidney. The distinctive features of these morbid conditions have been sufficiently pointed out in their several descriptions, the characters of the enlargement, as well as those of the urine, being important elements in diagnosis. It may be requisite to employ an exploratory trocar or the aspirator before any positive conclusion can be arrived at. The tumor may become so large as to fill the abdomen, so that it becomes impossible, except by the history, to recognize its origin; and when due to an accumulation of fluid, it may come to simulate ascites. A renal tumor may be mistaken for one in connection with the ovary, uterus, suprarenal capsule, liver, spleen, or neighboring absorbent glands, or for an accumulation of fæces in the intestines.

2. *Prognosis.*—The prognosis of the diseases described in this chapter is very unfavorable. Cancer is necessarily fatal. Accumulations of fluid in connection with the kidneys, especially if of a purulent character, are exceedingly dangerous, owing to their effects upon the renal structure, the constitutional disturbance which they often set up, and the dangers of the

supervention of uræmia, or of the discharge of the fluid into the abdominal cavity.

3. *Treatment.*—If anything can be done for the rarer forms of kidney disease now under consideration, operative interference is generally called for. In hydronephrosis the first principle is to endeavor to remove the obstruction which causes the retention of urine, and frequent manipulation or shampooing over the renal region has sometimes been found effectual for this purpose. If this does not succeed, and there are indications of danger, tapping must be resorted to, by means of the aspirator or a small trocar, and the operation should be repeated if necessary. Hydatid tumor must be treated in the same manner as hydatid disease of the liver. The removal of the kidney for cancer or other solid tumor is scarcely permissible, but has been performed. Tubercular pyelitis requires similar treatment to other forms of this disease, the constitutional condition being attended to at the same time.—FREDERICK T. ROBERTS.

KIDNEY, Simple Cyst of—*See Kidney, Rare Diseases of.*

KIDNEY, Suppurative Inflammation in Connection With—

I. SUPPURATIVE NEPHRITIS—*Etiology.*—The causes of renal inflammation ending in suppuration are: 1. Injury from without. 2. Some direct irritation in the substance of the kidney, especially from a calculus. 3. Suppuration in the bladder or urinary passages, that in the kidney being set up either by extension or independently, the latter being probably the result of a kind of local pyæmia. 4. Embolism. 5. General pyæmia. 6. Extension of inflammation from surrounding structures.

Anatomical Characters,—Whatever may be the origin of the inflammation, the alterations in the kidney are in most cases similar at first, viz., enlargement of the organ; hyperæmia, much blood flowing on section; and diminution in consistence. It is supposed that an interstitial exudation then forms. Supppuration usually commences in separate points, which extend and coalesce so as to form one or more abscesses, these varying much in size. In most forms of the disease only one kidney is usually involved, and there is finally but a single abscess, which may attain large dimensions. If not opened, it generally bursts either into the pelvis of the kidney, externally in the loins, into the peritoneum or sub-peritoneal tissue, into the intestines, or into the thorax. Occasionally inspissation of the contents takes place, followed by caseation and calcification, a cure being thus affected. In pyæmia numerous scattered abscesses of small size are observed. It is said that pus is sometimes infiltrated through the kidneys, and also it may form within the tubules.

Symptoms.—Acute suppurative nephritis is generally accompanied with local pain in the corresponding lumbar region, often severe, increased by movement, and frequently shooting towards the bladder, testis,.or thigh, as well as with tenderness. The testis may be drawn up. The urine is diminished in quantity and concentrated, or even actually suppressed, and it frequently contains some blood or merely a little albumen, but these elements may be quite absent. As a rule distinct rigors usher in the complaint, followed by marked pyrexia, which has a great tendency to assume a typhoid type, especially when suppuration commences, this being accompanied with repeated shiverings. Sympathetic vomiting is not uncommon. Uræmic symptoms are also liable to arise. Should a large abscess form, it presents as an elastic or fluctuating fulness or tumor, usually in the lumbar region, where it may afterwards burst. If it opens into the pelvis of the kidney, a copious discharge of pus takes place along with the urine and this may afterwards continue either persistently or at intervals. Various symptoms may result from the bursting of a renal abscess into other parts. When the kidneys are involved in pyæmia, there are no prominent local signs, and such is often the case when renal inflammation follows some morbid condition of the urinary passages, when it also frequently runs a somewhat chronic course.

II. PYELITIS—INFLAMMATION OF THE PELVIS OF THE KIDNEY—PYONEPHROSIS.—*Etiology.*—Pyelitis signifies inflammation involving the mucous lining of the pelvis and infundibula of the kidney. Its important causes are: 1. Direct irritation by foreign matters lodged in the renal pelvis, especially a calculus or gravel, parasites, and blood-clots. 2. Morbid deposits in the membrane, viz., cancer or tubercle. 3. Extension of inflammation from the bladder along the ureter. 4. Irritation by accumulated urine, resulting from closure of the ureter owing to pressure or internal obstruction, especially if this urine has become decomposed. 5. In rare instances pyelitis seems to be set up as an idiopathic affection from exposure to cold and wet, or other injurious influences. 6. A certain degree of catarrh of the renal pelvis and infundibula may also arise in the course of other diseases, especially various febrile affections, organic affections of the kidneys, and diabetes, or from the use of certain drugs, such as turpentine or cantharides.

Anatomical Characters.—Pyelitis may be acute or chronic, and the appearances vary accordingly. The acute form, in which the inflammation is usually catarrhal, is characterized by injection of the lining membrane, occasionally with slight ecchymoses or extravasations of blood; relaxation and softening ; shedding of epithelium ; and the subsequent discharge of a purulent mucus, or of actual pus. Occasionally diphtheritic or croupous inflammation is observed, along with a similar condition of other mucous surfaces. The chronic variety may either follow the acute, or commence independently. The membrane is then pale, though some of its veins may be permanently distended, often gray or slate colored from pigment ; much thickened, and usually firm. Pus is constantly formed, and if there is no obstruction it flows away with the urine; should there, however, be an impediment to its escape, the pus accumulates in the pelvis of the kidney, which it distends more and more, giving rise to the condition named pyonephrosis; here it is commonly mixed with other materials, such as urine, which is usually decomposed and ammoniacal, deposits or incrustations of uric acid and urates or phosphates, calculi or other materials which have excited the pyelitis, or blood. By degrees the substance of the kidney is compressed and invaded upon, until ultimately the organ may be completely destroyed, a mere sac remaining, containing pus and other matters. In other instances distinct disease is set up in different parts of the kidney, pyelo-nephritis, or it may simply shrivel up and become atrophied. The accumulation may burst in any of the directions which renal abscess takes ; or occasionally ulceration of the mucous membrane is set up by some foreign body, and perforation occurs before any particular distension of the pelvis is observed. In some cases the pus becomes inspissated, and abundant calcareous deposits are formed, or even imperfect bone, the cavity contracting and shrivelling up.

Symptoms.—In the majority of cases pyelitis is preceded by, or accompanied with, symptoms due to its cause, for instance, those of calculus or disease of the bladder. The local clinical phenomena associated with this complaint are uneasiness or pain over one or both lumbar regions, often of an aching character, or shooting downwards; tenderness; a sense of local weakness; generally frequent micturition ; changes in the urine; and in some instances the presence of a renal enlargement. The alterations in the urine may be the only deviation from health. This fluid is often increased in quantity ; generally acid ; and at first contains a little blood intimately mixed with mucus and the variously-shaped epithelium cells detached from the pelvis and infundibula; gradually it becomes mixed more and more with pus, until finally this morbid product may be present in large quantity, and it comes away persistently so long as no obstruction exists to prevent its escape. Albumen is only observed in proportion to the admixture of blood and pus. Some important differences are noticed in the character of the urine under certain circumstances. If the flow of pus along the ureter is impeded in any way, as by the lodgment of a calculus, the urine may become quite natural, provided only one kidney is involved; if both are implicated, or if the closure of the ureter is incomplete the quantity of pus is merely lessened. Should the obstruction be removed a copious flow of purulent urine again takes place suddenly ; this course of events may be repeated from time to time, or the obstruction may remain permanently. Further, if the urine is retained in the renal pelvis, it tends to decompose, and is then frequently discharged in an ammoniacal state. Should the different fluids accumulate here, a fulness or tumor is produced, having the general characters of a renal enlargement, but presenting an elastic or fluctuating feel. This fullness will increase in size from time to time should the ureter become obstructed, being then also more painful and tender, and it may suddenly subside when the impediment is removed. Occasionally the enlargement attains very large dimensions.

The genera. symptoms are those of pyrexia in the acute form of pyelitis, preceded by rigors. When suppuration is set up, there are commonly repeated rigors, in some cases recurring at regular intervals, and in prolonged cases signs of hectic fever appear. The bowels are often disturbed, there being either diarrhœa, or obstinate constipation, the latter resulting from pressure on the colon. If the kidneys become independently implicated, symptoms indicative of Bright's disease set in. In some cases recovery takes place, provided only one kidney is affected and the cause of the complaint can be removed, though often with complete destruction of the involved organ. Most commonly, however, death ultimately ensues from gradual exhaustion. This event may also result from perforation or rupture of the distended pelvis, the symptoms differing according to the direction in which the opening takes place, and the structure with which the purulent collection communicates.

III. PERINEPHRITIS.—In perinephritis the tissue surrounding the kidney becomes the seat of inflammation, the process usually terminating in suppuration. It may be caused by injury, exposure to cold, or by previous suppurative nephritis or pyelitis. Clinically it presents a history very much like that of the diseases just mentioned, but is distinguished from these affections by the absence of any marked disturbance of the renal functions or of any changes in the urine. There may also be a greater intensity and superficialness of the pain and tenderness, with more marked exacerbation on movement, and subcutaneous œdema over one lumbar region may be observed. The purulent accumulation generally opens posteriorly, but may rupture in various other directions.

General Diagnosis, Prognosis and Treatment.—1. *Diagnosis.*—The inflammatory affections just described are generally attended with much pain referred to the renal region ; functional disturbance of the kidneys, except in the case of perinephritis ; and pyrexia. They can in most instances be distinguished by the circumstances under which each occurs, and by the characters of the urine. Acute Bright's disease is diagnosed from these affections by the dropsy and other characteristic symptoms which accompany it, as well as by the condition of urine. In pyelitis the presence in the urine of epithelium from the pelvis and infundibula is highly important, while later on pus appears. Suppurative nephritis may give rise to the physical signs of an abscess in the renal region. Perinephritis is, as a rule, but not invariably, distinguished by the absence of any morbid characters of the urine. Active renal congestion might possibly be mistaken at first for some of the inflammatory affections, but the milder character of the symptoms, and their speedy subsidence, sufficiently characterize this condition. Acute cystitis sometimes simulates renal inflammation.

2. *Prognosis.*—Suppurative inflammatory diseases in connection with the kidney are very dangerous, on account of the interference with the renal functions, the constitutional disturbance which they occasion, and the dangers incident to the rupture of any purulent accumulation. Pyelitis differs much in its gravity according to its duration, its cause, and whether it is single or double. When confirmed, this complaint is always serious, but even after complete destruction of the kidney recovery may follow, provided only one organ is involved. Calculous pyelitis is much more favorable than that which follows chronic disease in the lower urinary passages, or than that which is excited by tubercle or cancer.

3. *Treatment.*—The general measures applicable at the outset in all the forms of acute renal inflammation are to keep the patient in bed, completely at rest; to cup over the loins to the extent of from 6 to 10 or 12 ounces if the case is favorable, or otherwise to dry cup freely; to apply hot poultices or fomentations constantly over the lumbar region; to give low diet, with abundance of diluent drinks; and to act freely upon the bowels. In suppurative nephritis or perinephritis, should signs of an abscess appear, this should be encouraged towards the surface, and the pus evacuated when the proper time arrives, for which purpose the aspirator is most serviceable. At this time abundant support, along with stimulants, may be required, especially if typhoid symptoms should set in. In pyelitis it is very important to remove the cause of the disease if possible, and when the complaint is due to a calculus, a considerable amount of opium, or free subcutaneous injection of morphia is often needed, in order to relieve pain. The measures requisite for the treatment of purulent discharge in the urine have already been considered.—FREDERICK T. ROBERTS.

KIDNEY, Tubercle of.—*See Kianey, Rare Diseases of* .

KIDNEY, Tumor of.—A tumor connected with the kidney has the following general characteristics: 1. It is extra-pelvic, occupying mainly one or other lumbar region, and it cannot be separated from the mass of muscles behind. It, however, increases in a forward direction to a variable degree, sometimes attaining an enormous size, and giving rise to general enlargement of the abdomen. 2. The shape is generally more or less that of the kidney, the borders being rounded, but irregularity is not unfrequently observed in this respect. 3. As a rule the consistence is firm; occasionally there is a feeling of softness, or even distinct fluctuation may be detected. 4. The tumor is almost or quite fixed, not being altered by manipulation or by respiratory movements. 5. Percussion reveals dulness extending back to the spine, with tympanitic note in front, unless the tumor becomes extremely large. 6. In some cases it may be advisable to use the aspirator or exploratory trocar in the diagnosis of renal tumor.—FREDERICK T. ROBERTS.

KINK-COUGH—*See Hooping Cough.*

KNEE, Dislocation of—*See Dislocations.*

KNEE, Excision of—*See Excision of Joints.*

KNOCK-KNEE, (Genu valgum).—A deformity in which the knee is bent inwards.

Causes.—Rickets; muscular weakness, combined with habits of excessive standing, or of carrying heavy burdens; lazy manner of walking and standing. About puberty a disease is liable to attack the epiphysial cartilages somewhat analogous to the rachitis of childhood. These cartilages are then peculiarly liable to give way from the causes above mentioned. Hence many cases of genu valgum, and even spinal curvature. (See Mikulicz in v. Langenbeck's Archiv xxiii. 3 to 4; and also Busch, Die Belastungsdeformitaten der Gelenke, Berlin, 1880.)

Anatomy.—The diaphyses of the femur and tibia grow faster on the inner than on the outer side. Thus the internal condyle is pushed downwards, and the inner part of the upper epiphysis of the tibia upwards. At the same time the diaphyses often grow curved, with the convexity inwards. The patella tends outwards, towards the external condyle. The internal lateral ligament is relaxed in cases which commence at or near puberty, but not in the knock-knee of rachitic children.

Treatment.—In early age the most severe cases can usually be cured by judicious and persevering use of splints or irons, and elastic force, combined with tonic medicines and hygiene. But some plan of osteotomy has to be followed when the bones are hard.* Such operations are (1) Ogston's, (2) Chiene's, (3) McEwen's, (4) Reeve's, on the femur, and (5) Barwell's, on femur, tibia and fibula. M. Delore forcibly bends the knee straight during anæsthesia, and then secures it in a movable dressing. He says that this procedure separates the inferior epiphysis of the femur. Dr. Ogston makes a small incision through the skin and saws off the internal condyle sub-cutaneously, and then easily brings the limb straight. McEwen chisels nearly through the femur above the condyles, and then puts the limb straight. This is a very satisfactory operation. Use antiseptics. Chiene's and Reeve's modes of operation differ from Ogston's in that the former removes a wedge of bone, and therefore alters the joint-surface less, while the latter chisels up to, but not through, the articular cartilage. Chiene uses the chisel.—See Osteotomy.—C. B. KEETLEY.

KOLPOCYSTOTOMY.—This word, made up from *kolpos*, vagina, *kustis*, bladder, and *temno*, to cut, is applied to the operation for establishing an artificial communication between the vagina and bladder for the extraction from the latter of foreign bodies, and as a means of securing continuous drainage of the same organ when diseased and requiring to be put at rest. The word has the recommendation certainly of classical conciseness, and is therefore preferable to the terms in general use of vagino-vesical lithotomy or vaginal cystotomy.—NATHAN BOZEMAN.

KOLPOCYSTOECPETASIS.—This word, derived from *kolpos*, vagina, *kustis*, bladder, and *ekpetannumi*, to stretch out, is intended to designate the simultaneous distention of the vagina and bladder, it being assumed that both organs are in a state respectively of kolpostenosis and cystostellosis with a communicating fistule in the vesico-vaginal or vesico-uterine septum, or that cysto stellosis alone exists independently of kolpostenosis with incontinence of urine, as a result of injury, deformity, over-distention or paralyzation of the urethra. The mechanism of the distention of the bladder is to the effect that after the completion of kolpostenotomy, a dilator of exact size is introduced into the vagina which obliterates the orifice of the vesico-vaginal fistule, like the lid when placed upon the mouth of a modern milk jar, and which at the same time compresses at its lower end the root of the urethra against the pubes, thus enforcing retention of the urine by the bladder, and consequently dilatation of the organ. If kolpostenosis does not exist and cystostellosis be alone present with incontinence of urine arising from the pathological conditions of the urethra named, the same mechanism as regards the compression of the root of the urethra takes place with precisely the same results as to the production of cystoecpetasis, and the development of the requisite power of the bladder to retain and discharge the urine at stated intervals, more or less long.—Nathan Bozeman.

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* It is difficult to give any concise and precise rules or indications for osteotomy in genu valgum. In each case the age of the patient, the amount of the deformity, its duration, its causes, its precise anatomical nature, and the effect upon if of experimental splinting, have to be considered.

KOLPOCYSTOLITHOTOMY.—This word, also compounded of Greek derviatives—*kolpos*, vagina, *kustis*, bladder, *lithos*, stone, and *temno*, to cut—expresses the precise character of the operation for the removal of stone from the female bladder, and might well take the place in the vaginal nomenclature of diseases and operations, as possessing a decided advantage over the terms commonly employed.—Nathan Bozeman.

KOLPOECPETASIS.—In its general acceptation this word *kolpos*, vagina, and *ekpetannumi*, to stretch out, means to dilate or to distend the vagina when contracted, shortened, distorted or misshapened, either with or without perforating lesions of the bladder and rectum. When employed or associated with kolpostenotomy as preparatory measures with all imimproved appliances of dilators for reaching and maintaining the highest expansion, the reparation of the lost functions of the vagina, the bladder, the rectum and the cervix uteri to whatever extent involved, is brought to the maximum degree of certainty. Thus is given to kolpostenotomy and kolpoecpetasis jointly under the generic term of genital anakainosis (*ana* again, and *kainizo*, to restore) the widest range of practical usefulness with strict preservation of the normal functions of the organs involved, the highest physiological standard of cure. From their association and their defined limits of employment in practice the success of the operation for urinary and fecal fistules was placed upon a new basis, and has been carried, it may now be justly claimed, from one cure out of two cases to upwards of nine cures out of ten cases, according to the physiological standard above stated, with a mortality not exceeding four per cent.—Nathan Bozeman.

KOLPOKLEISIS.—Of late years the generic term, genital kleisis, has been applied to all that class of expedients which cover up or hide away from view, in the vulvo-vaginal and uterine tract, open lesions communicating with the urethra, the bladder, the rectum and the cervix uteri, separately or conjointly, thought to be otherwise incurable. But of the great number of expedients belonging to the class that of kolpokleisis, *kolpos*, vagina, and *klio*, to shut, as first employed by Prof. Simon, is by far the most important, from the many supporters it has had among surgeons and gynæcologists. Any perforating lesion of the vesico-vaginal or recto-vaginal wall, associated with kolpostenosis above or below, and supposed to be insurmountable by kolpostenotomy, and an immediate attempt at closure, is thought by the advocates of kolpokleisis to justify some one of its several adaptations. The expedient comprises every devisional occlusion or abridgement of the vaginal and uterine tract, and every sectional interference or abridgement of one or the other of the walls of the vagina, with total disregard of the normal functions of the organs involved other than the lost one of continence of the urine on the one hand and of the fæces on the other. When continence is thus secured as regards the former, it is generally at the expense of repeated operations and a concomitant mortality of 25 per cent., and as regards the latter, at the sacrifice of feelings on the part of the subject herself, amounting, as may be supposed, to supreme disgust, to say nothing of the secondary dangers to life arising from diseases of the rectum, vagina, bladder and kidneys, some of these terminating fatally, as is known to be the rule, in from five to ten years.—Nathan Bozeman.

KOLPOPROCTOTOMY.—Derived from *kolpos*, vagina, *proktos*, rectum and *temno*, to cut. This word is applied to a surgical procedure for the establishment of a communication between the vagina and rectum at any point below the recto-vaginal reflection of the peritoneum. It is only called for as a preparatory step to secure a rectal diverticulum for the menstrual fluid and urine when the destruction of the vesico-vaginal septum and the urethra is thought to be so extensive as to preclude the possibility of separation, and it is desirable to perform episio-urethrokleisis or episio-vulvokleisis. Both of these expedients are comprised in the family of genital kleisis, and alike with the others of the class, they betray a defectiveness of surgical resources, and fall under the ban, to say the least of them, of very questionable utility.—NATHAN BOZEMAN.

KOLPOSTENOSIS.—This word *kolpos*, vagina, and *stenos*, narrow, is applied to partial contraction or narrowness of the vagina as a consequence of direct injury caused by the child's head in difficult labor, by the maladroit use of instruments, by the existence of pelvic exostosis, by the presence of a calculus in the bladder at the time of labor, etc., whether through sloughing, suppuration, ulceration, perforation or otherwise. The contraction usually exists in the form of adhesions between the opposing walls of the vagina, in outstretching patches or plates of inodular tissue, in cicatricial bands coursing in every direction, in restraining bridles, in projecting arches, and associated more or less with all these features there is limited or general infiltration of the connective tissue in and around the vagina and uterus with plaster exudations. The vagina thus contracted or narrowed ranges from the merest distortion of its calibre down to the smallest sized probe. The designation of kolpostenosis given to these pathological conditions is not to be confounded with atresia of the vagina. *A* and *trao*, to pierce, meaning complete occlusion or obliteration of the canal, resulting from the causes above stated, and, in addition, from those of the ordinary phlegmasias met with in practice.—NATHAN BOZEMAN.

KOLPOSTENOTOMY.—The derivation of this word is from *kolpos*, vagina, *stenos*, narrow, and *temno*, to cut. In its widest sense it means to separate the adherent walls of the vagina, to cut into the thickened walls of the same by short or long incisions when cicatricially narrowed or distorted, to divide cicatricial bands and bridles of the same or any obstacle of inodular tissue encroaching upon the lumen of the organ, and brought about from whatsoever cause, or associated with whatsoever penetrating lesion of the bladder, or rectum, or cervix uteri, or of all together. The operation is intended to be either an immediate or preparatory step to the re-establishment of the calibre of the vagina and to the reparation of its lost functions to whatever extent they may be involved alone or conjointly with those of neighboring organs. But as an immediate step for accomplishing the objects above named, the range of kolpostenotomy alone is very limited, and as a result of this, two different lines of practice have come to be recognized, based upon very different principles. These differences may be thus stated:

I. Kolpostenotomy alone as preparatory treatment with immediate closure of fistule, regardless of complications.

II. Kolpostenotomy with kolpoecpetasis as preparatory treatment, with deferred closure of fistule until all complications are overcome.—NATHAN BOZEMAN.

KYPHOSIS—*See Spine, Diseases of.*

LABIA, Affections of.—The external genital organs of the female are liable to (1) hypertrophy, (2) cystic tumors, (3) venereal diseases, especially warts and ulcers, (4) epithelioma, (5) hæmatocele, (6) varix, (7) abscess, beside other affections of less frequent occurrence. Affections of the labia are modified by (1) the vaginal and vesical discharges to which they are so often exposed, (2) the hindrance to the circulation, due to the dependent position of relaxed or hypertrophied labia; (3) the dirty habits of some patients. In treating them beware of severe parenchymatous hæmorrhage.—See article Hæmorrhage.

Cysts of the labia are particularly frequent in young women, especially shortly after marriage. They are commonly caused by hypertrophy of the follicles of Cowper's glands. Lay them freely open and insert lint in the cavity.

Hypertrophy of the labia or of the clitoris usually originates in venereal inflammation, but persists after the cause is removed. *Treatment.*—Excision. Acupressure may be used to repress troublesome hæmorrhage.

Congenital Cohesion of the Labia.—Easily remedied by tearing with the handle of a scalpel. Oil the surfaces well, and instruct the nurse to keep them separated with a piece of oiled lint for a few days.—C. B. KEETLEY.

LABOR, Premature..—There are certain dangers inherent to the process of parturition which, in spite of scientific midwifery and the prophylactic resources of intelligent hygienic management, must forever invest it with importance, and produce a certain loss of life in its performance. The most sanguine of modern obstetricians must admit that the perils of childbirth, which have been recognized in all ages and among all people, will never disappear, but must forever endure as a fulfilment of the primal curse, "In sorrow shall thou bring forth children."

He may turn with pride to the advances in pathology and improvements in practice which have marked the modern school of obstetrics; he may enumerate with warrantable gratification the surgical procedures that now render manageable abnormal labors with which our forefathers could not cope; he may point to a marked improvement in the statistics of the lying-in chamber, yet still he must feel and admit that much—very much—remains to be done. When he reflects upon the statement made by one of the most eminent living obstetricians, that in England and Wales, which contain but twenty million people, three thousand women die annually in childbirth, he must acknowledge that it is the duty of every obstretrican to study with the utmost devotion those influences which, exerting themselves before, during, and after delivery, accomplish this unfortunate result.

As I have just now stated, a certain number of these influences are unavoidable, being either inherent to the process of parturition, or developing themselves without warning in the moment of its performance. But while in some unfortunate cases no premonitory symptoms will occur to forewarn the most watchful and intelligent practitioner of the danger which awaits the paturient act, I do not think that I assume a position which is untenable when I state that, in most instances, the most serious complications of labor, both as regards mother and child, may be recognized by their peculiar premonitory signs, one, two, or even three months before the end of pregnancy, and being recognized may fortunately often be avoided. My impression is, that nothing will in the future tend t diminish the mortality attendant upon parturition so markedly as the i duction of premature delivery for the removal of mother, child, or b from that condition upon the continuance of which depends the dan which menaces them.

Before proceeding further, let me state that in this essay I shall mak marked distinction between premature labor and abortion. The form denotes a premature expulsion of the contents of the uterus; the latter failure in the results of utero-gestation. Consequently, the induction premature labor is in one essential respect different from that of aborti and is called for in the fulfilment of different indications. The former, being resorted to after the period of viability of the child, does not involve the sacrifice of its life, but often adds to its prospect of living by removal of it from a position of danger, and sometimes even of certain death; or, to put the matter more tersely, abortion is resorted to in the interest of the mother alone at the expense of the life of the child; premature labor is induced sometimes for the sake of the mother, sometimes for that of the child, and sometimes in the interest of both. For the sake of preventing irrelevancy of discussion in any argument which may be suggested by my remarks, I would particularly point out the fact, that the subject which I have undertaken is strictly limited to the consideration of the induction of premature labor, and in no way concerns that of the induction of abortion.

The practice of inducing premature labor, unlike that of abortion, is of very recent date. Denman informs us that in the year 1756 a congress of physicians was held in London for the purpose of discussing the advantages of the procedure. It was approved of, and since that time its adoption has steadily though slowly extended.

The following list presents the morbid states for which I should consider the operation indicated:

1. Deformity of the pelvis.
2. Placenta prævia.
3. Aggravated uræmia.
4. Excessive vomiting.
5. Placental apnœa.
6. Commencing epithelioma.
7. Death of child and consequent septicæmia.
8. Threatened death of child.
9. Approaching death of mother.
10. Amniotic dropsy.
11. Previous rupture of uterus or performance of the Cæsarean section.
12. Excessive accidental hæmorrhage.
13. Previous difficulty in deliveries of large children, or of children with ossified sutures.
14. Tumors obstructing the pelvis.

From this enumeration of indications for the induction of premature delivery, I have intentionally excluded a number which call for abortion, but not for the procedure which now engages our attention. I have likewise, for the purpose of avoiding prolixity and a spurious show of completeness, omitted the enumeration of certain rare conditions which might call for it, but would in all probability never do so. As examples of such indications let me mention the existence of ovarian and fibroid or fibrocystic tumors in the abdomen; the differentiation of an extra-uterine pregnancy from a tumor, etc., etc. The ground left untouched in the list given may be covered by two general statements; first, any condition threatening the life of mother or child after the period of viability, which could be removed by premature delivery, would call for its induction; second, any obstruction existing in the true pelvis which would allow the passage of a child that has not arrived at the full period of intra-uterine life, and would prevent the exit of one which has reached the end of the ninth month, without mutilation, would prove a valid indication.

I shall now consider each condition which I have enumerated, in turn, giving clinical cases as instances of a resort to the operation for such indications as appear to require illustration from their novelty or the doubtfulness of their claims.

Deformity of the Pelvis—Premature delivery has been more frequently induced on account of this condition than any other which has been mentioned. That this should be so is a natural deduction, when it is borne in mind that in the great majority of instances it is the indication which calls for those dangerous procedures, craniotomy, embryotomy and the Cæsarean section. Out of 300 instances in which premature delivery was resorted to in British practice, according to Dr. Tyler Smith, in an able essay in the first volume of the London Obstetrical Transactions, 273 operations were necessitated by pelvic distortion. 273 out of 300 presents a most disproportionate ratio, but the hearer must remember that these are the statistics of a past age. Every progressive obstetrician of to-day will bear me out in the assertion that many indications which until lately have not claimed the advantages of this operation will now do so, and make the disproportion in favor of deformity of the pelvis much less marked.

It is difficult to say what degree of deformity calls for the procedure, but in general terms it may be stated that, wherever it is estimated, or, as is far better, where it is proved that a child at full term cannot be delivered except by instrumental or manual means, premature delivery is called for. Still speaking generally, the normal length of the shortest diameter of the pelvis is 4 inches; between this and 3 inches is the domain of the forceps; between 3 inches and 2½, that of version; between 2½ and 2, that of craniotomy; and under 2 inches that of Cæsarean section. I shall not argue as to the propriety of preferring premature delivery to the terrible risks attendant upon the graver of these procedures, for all will admit it. I take a position which will be less frequently acknowledged when I state that so safe is the premature and artificial delivery of a child at the eighth or eighth and a half month of utero-gestation, by our present methods, that it should be preferred to delivery by the forceps at the tenth menstrual epoch. But under the last circumstances the necessity for interference must be established not by measurements, which do not display slight contraction; it must have been proved by past experience with the particular patient whose case engages attention.

For such a condition as that which I have depicted, I have twice induced premature delivery. One of these cases will suffice as illustrative of my proposition:

I was requested in the month of March last, by Dr. Wm. B. Bibbins, to see with him Mrs. McD., an Irish woman, aged thirty-six years, who had been married seven years and borne four children. She gave the following history of her labors. The first child, a small girl, was delivered at full term by the forceps, by Dr. Ramsey. She was in labor, she says, four days. This child lived for one year. The second child was a larger girl, which was delivered by forceps, and was still-born. The third was delivered by version, by Dr. Gillette, and was still-born. The fourth was delivered by myself, in consultation with Dr. Bibbins, by version, and was still-born. She was now pregnant for the fifth time, and was extremely solicitous for a living child. With Dr. Bibbins's consent, I promised her that delivery should be brought on in three weeks from date, when she would be at the end of the eighth month of pregnancy. A careful examination of the pelvis convinced me that it was a *justo minor* pelvis, but one not relatively deformed.

On the appointed day, Dr. Bibbins, Mr. Hall, a student of Dr. B., and myself, met at the house of the patient, and proceeded to bring on delivery in the following manner: We placed the patient in the obstetric position, with a tub of warm water under the edge of the bed, and for half an hour showered the os freely. At the end of that time I put in Barnes' smallest dilator, and in an hour the os was fully dilated, and the bag of membranes presenting; no labor pains came on, and in twenty-four hours we met again, and I used the warm douche for a half hour, dilated the os fully with the largest dilator, and introduced a No. 6 gum-elastic catheter between the membranes and the uterus, up to the fundus. In twenty-four hours we met again, and, to my surprise, found that no uterine contraction had occurred. The catheter was now removed and inserted upon the other side, an enema of salt water was thrown into the rectum, and the largest dilator again introduced. We waited over an hour, and still there was no uterine effort. Slight hæmorrhage from the uterus now occurred upon removal of the dilator, and fearing for the child I proposed at once to deliver it. Dr. Bibbins consenting, the patient was anæsthetized, and, passing the hand into the vagina, and two fingers into the uterus, I readily delivered a vigorous boy, who has since done well, as has also his mother. I have met with but one other case—one, by the way, which was coincident as to time with this one, in which it was so difficult to excite uterine contractions.

PLACENTA PRÆVIA.—No one who has had experience with this form of complicated labor will feel disposed to undervalue or cast aside any remedy which is offered for the rescue of patients presenting its premonitory symptoms. So serious are its results that, although it occurs not oftener than once in five hundred cases, which is the proportion computed as correct by some authors, it exerts a marked influence upon the statistics of obstetrics. According to the calculation of Sir James Simpson, based upon the analysis of three hundred and ninety-nine cases, one-third of the mothers and over one-half of the children are supposed to have been lost. The reasons for this great mortality are probably the following:

1. The dilatation of the cervix for the passage of the child, unavoidably exposes both mother and infant to great danger from placental detachment and hæmorrhage.

2. Repeated hæmorrhages occurring during the ninth month; as the os internum dilates under the influence of painless uterine contractions, which then occur, the woman at the time of labor is usually exsanguinated, exhausted, and depressed both physically and mentally.

3. Profuse flooding generally occurring with the commencement of labor, the medical attendant is often not at hand, and reaches his patient only after a serious loss of blood has occurred.

Fortunately, this condition is usually announced during the last months of utero-gestation by the premonitory signs of reliable character, and thus we may empty the uterus before the vital forces of both mother and child are exhausted by hæmorrhages the result of repeated detachments of the placenta. My conviction is that, in every case of declared placenta prævia, premature delivery should be induced. What objections can be urged against it, other than that a child of less than nine months of intra-uterine life does not have as good a prospect of life as one which has arrived at full term? In the case which we are considering, even this falls to the ground, for an eight-months child out of the uterus, and depending upon pulmonary respiration, has a brighter prospect for life than one in that cavity depending on aëration of its blood upon a crippled and bleeding placenta. For the mother, how incomparably greater the safety which attends an emptied and contracted uterus! By inducing delivery during the ninth month of pregnancy, we should be dealing with a woman who is not exhausted by repeated hæmorrhages; we would be in attendance at the moment of cervical dilatation, and consequently the moment of danger; and we would be able by hydrostatic pressure to control hæmorrhage in great degree, while at the same time dilatation of the cervix, which constitutes the period of maximum danger, may be rapidly accomplished.

With these considerations before me, and with a certain amount of experience to support them, I cannot resist the conviction that, when premature delivery becomes the recognized and universal practice for placenta prævia, the statistics of Dr. Simpson will be replaced by others of a far more satisfactory kind.

I have induced premature delivery for placenta prævia four times, and, as the subject appears to me of paramount importance, I risk the danger of wearying my readers by detailing all the cases:

CASE I.—Mrs. W., aged twenty-six, primipara, in good health, was suddenly taken with hæmorrhage three weeks before full term. She sent for me in great haste, but, being occupied, I was unable to go to her, and she was seen for me by my friend, Dr. Reynolds. He discovered that she had lost a few ounces of blood, but that the flow had ceased. Three days afterward she was again affected in the same way, the flow ceasing spontaneously. About a week after this, she was taken during the night with a a flow, which was so profuse as to result in partial syncope when she endeavored to walk across the room. I saw her early the next morning, found her flowing slightly, and, upon vaginal examination, succeeded in touching the edge of the placenta through the os, which was dilated to the size of a ten-cent piece. Later in the day, Drs. Metcalfe and Reynolds saw her and agreed in the propriety of premature delivery. In accordance with this consultation at 7 P. M. I introduced into the cervix, with considerable difficulty, and by the employment of some force, the smallest of Barnes's dilators. This in twenty minutes was followed by the next larger dilator, and in an hour by the largest. Dilatation was rapidly accomplished, but, instead of removing the largest bag, I left it in the cervix until 10 o'clock that night. Expulsive pains coming on at that time, I removed it, when the head rapidly engaged, and before morning Mrs. W. was safely delivered of a living girl. The placenta followed rapidly, and both mother and child did well.

In this case, although hæmorrhage continued slightly throughout the labor, it was never sufficiently profuse to endanger the lives of either mother or child. The implantation of the placenta being lateral, diminution of the flow occurred as the head advanced, and made firm pressure against the bleeding surface.

CASE II.—Mrs. D., a lady over forty years of age, whose last pregnancy had been completed fourteen years previously, was placed under my care by Dr. Metcalfe. She was an excessively nervous and hysterical woman, but in good health. About three weeks before full term she was taken with hæmorrhages, which lasted for very short periods, recurred at intervals of four or five days, came on without assignable cause, and ceased without remedies. The cervix was not dilated, and no physical sign of placenta prævia could be detected either by vaginal touch or auscultation. Dr. Metcalfe was in consultation, and, as all rational signs of placenta prævia were present, and our patient was suffering from the repeated losses, and was becoming extremely nervous and apprehensive, we concluded to bring on premature delivery. Accordingly at 11 A. M. I introduced a large sponge-tent into the cervix, and at 3 or 4 P. M. removed it, and succeeded in inserting Barnes's smallest dilator. At 9 that night the cervix was fully dilated at the expense of very light hæmorrhage, and Dr. Metcalfe then being present, I removed the bag, intending to leave the case to Nature, provided no flow occurred. Previously, during the evening, upon changing the bags, I had distinctly touched the head as the presenting part, but now, to my surprise, I found that the bag impinging on this part had caused the child to revolve in the liquor amnii, and that the breech was now within the os.

We decided under these circumstances to deliver at once. The patient being put under the influence of ether, I drew down the legs and delivered a living, female child. The placenta following in fifteen minutes, an both patients did well, the child rapidly recovering from an injury to one of its legs, received during delivery.

In this case, the placenta was very nearly centrally attached. At one side of the os internum, a space of only two fingers' breadth was free. Through this, digital examinations were made, and the hand pushed to seize the feet. The first stage being accomplished by means of the hydrostatic dilators, no hæmorrhage attended it; but, without this means having been employed, it is highly probable that profuse and dangerous flooding would have occured.

CASE III.—Mrs. P., a multipara, aged thirty-eight, had advanced, without any unfavorable symptoms, to the middle of the ninth month of pregnancy. At this period, while sitting, at 9 P. M., in her parlor, engaged in some light needle-work and in conversation, she suddenly felt a free flow of blood pouring away from the vagina. In a few moments she became very much exhausted, and was lifted up by her husband and carried upstairs to bed. I saw her within an hour after this, and found her still losing blood to a slight extent. Her pulse was very rapid and weak, and her face extremely pallid. It was estimated that about one quart of blood had passed, through this was of course uncertain.

As the flow had ceased after I had kept the patient quiet for an hour, I left the house, promising an early visit in the morning. Upon this visit I found her doing well, though somewhat exhausted. Feeling satisfied from the great amount of flow, and the fact of its having occurred without any exciting cause, that placenta prævia existed, I now explained the state of affairs to my patient's husband, and requested Dr. Metcalfe to see her in consultation. He agreed with me that the probability of the safety of both mother and child would be greatly increased by at once inducing premature delivery, and at 9 that night I set about accomplishing it. At 9.30 exactly, in the presence of Dr. Metcalfe, I introduced into the cervix the smallest size of Barnes's dilators, and at 10.30 the os was fully dilated. So long as the bag was retained in the cervix, no hæmorrhage occurred, but on the instant of its removal a flow took place. Under these circumstances, it was thought best to deliver at once. The patient being put under the influence of chloroform, I performed bimanual version, and with great ease delivered a living child. The placenta soon followed, and mother and child recovered without an unfavorable symptom.

In this case, delivery was accomplished in one and a half hours from the commencement of the effort, and the process was inaugurated just twenty-four hours after he development of the first symptoms of danger. The flow which constituted this symptom was so sudden and alarming that we thought that great danger would attend delay, uncompensated for by any corresponding advantage. After full dilatation and removal of the dilator, Dr. Metcalfe examined and found a very large piece of placenta hanging out of the os uteri, and thus the diagnosis was proved to have been correct.

CASE IV.—I was called on the 14th of November, by Dr. Keeney, to see with him Mrs. R., a multipara, aged twenty-three years, who was nearly at the end of the seventh month of pregnancy. About one week before our visit, she had been suddenly seized with quite a profuse hæmorrhoge, which had rapidly diminished, but never completely disappeared. The nature of the flow, which occurred by sudden gushes, and in great profusion, led us to the conclusion that it was due to placenta prævia, but as the period was not favorable to the viability of the child, we determined to avoid interference until the eighth month, if possible. The patient was accordingly kept perfectly quiet in bed, and all effort avoided. For two and a half weeks this plan appeared to succeed, and we had strong hopes of reaching a period when both child and mother might be rescued by premature delivery. When the seventh month and one week of the eighth had passed, the flow returned, and continued so steadily that, to our regret, we were forced to empty the uterus in the interest of the child, who was evidently becoming much enfeebled by gradual placental detachment, and of the mother, who likewise felt the loss of blood very perceptibly.

At this period Dr. Keeney and I met at the patient's house at 8.30 P.M. At twenty minutes before 9 I introduced Barnes's smallest dilator. At ten minutes after 9 the os was fully dilated, and I, introducing my hand, readily delivered a living child by version. The child was evidently very feeble, and, although at once wrapped in cotton and surrounded by an atmosphere heated to 95°, it lived only about nine or ten hours,

In this case, as soon as the os was fully dilated, we could distinctly feel the placenta, and as I passed up my hand I found that it was centrally attached. It is the only case in which I have met with complete placenta prævia. The mother recovered without an unfavorable symptom.

AGGRAVATED URÆMIA.—The pregnant woman is peculiarly liable to a form of desquamative nephritis, which probably depends in part upon direct pressure of the enlarging uterus upon the kidneys and their blood-vessels. This condition, which marks its presence by albuminuria, anasarca, and the cerebral and gastric symptoms ordinarily attendant upon uræmia, has been appropriately styled puerperal nephritis. Unlike ordinary nephritis, and like that which results from scarlatina, it is usually ultimately recovered from. When complicating utero-gestation, however, this form of nephritis proves the most fruitful of all the sources of convulsions, œdema of the lungs, and puerperal mania. It develops generally after the sixth month, and becomes aggravated as the uterus continues to enlarge and exert greater pressure upon the kidneys. Sometimes, however, it does not appear till the end of the eighth month, when the danger to the patient steadily increases until the uterus has been emptied. This condition often calls for premature delivery, in order that the woman's blood may not become more and more impure, as greater and greater pressure upon the kidneys occurs; that the daily increasing risk of convulsions may be avoided; and that the child, in danger from the poison accumulating in its own as well as its mother's blood, may effect aeration by some other means than the contaminated placenta.

I have not space, nor do I deem it essential even if I had, to enter here upon the subject of statistics as applied to the proportion of women affected by puerperal nephritis, who escape the evils which I have mentioned. It will answer my purpose in addressing a body of practical physicians, to refer merely to a fact, which they all know as well as I, that a large number of women, who suffer from all the symptoms of puerperal nephritis, escape those results of blood-poisoning to which I have drawn attention. To place before them as clearly as possible the fact that I do not advocate premature delivery merely because this complication of pregnancy exists, I would divide all the cases of the affection into three classes:

1. The class in which only a cloudiness of the urine develops under heat and nitric acid, and in which only slight anasarca and nervous disturbance exist. For this, no other interference is usually necessary than stimulation of the intestinal and cutaneous secretions, steady and systematic examination of the urine, and avoidance of tight clothing, nitrogenized food, and habits of luxury.

2. The class in which a copious deposit of albumen takes place under heat and nitric acid; anasarca to a moderate degree exists; and gastric and cerebral symptoms show the influence of retained renal secretions to such an extent as to create considerable annoyance. For this class the

general management already indicated should be pursued; the urine should be carefully examined every third or fourth day during the last two months of pregnancy, so that any increase of renal congestion might at once be recognized as an indication for interference, and the patient be delivered under chloroform.

3. The class in which the urine treated by heat and acid undergoes almost complete coagulation; excessive anasarca exists; the stomach, brain, and nervous system sympathize; and tendency to coma is denoted by constant desire for sleep. So long as cases of the first class keep within their legitimate bounds, they do not call for premature delivery. Even while those of the second class keep within their limits, they may require it, but do not of necessity do so; but in the third class this resource will always offer itself as a haven of safety for both mother and child. To express this more concisely, I would say that the first class very rarely, the second class sometimes, and the third class always, calls for the induction of premature delivery.

For this indication I have induced premature delivery three times. All the mothers recovered and two of the children. One child was known to be dead at the commencement of the process. I shall give very short notes of these cases:

Case I.—Mrs. B., a multipara, aged thirty-two, had lost her father, mother, and one sister, of Bright's disease, and in her only previous labor had suffered from convulsions, caused by puerperal nephritis. She advanced quite well to the seventh month, when suddenly the gravest symptoms of uræmia developed themselves. By general management she was carried to the end of the eighth month, when she could, without straining the point at all, be classified in my third group. At this time I used the warm douche at mid-day, separated the membranes by a silver catheter two hours afterward, and at 6 P. M. introduced Barnes's middle-sized dilator. At 7 P. M. this was removed, and a gum-elastic catheter introduced to the fundus uteri. This soon excited labor-pains, and in three hours a large girl was born. The mother was delivered under chloroform. Both patients did well.

Case II.—Mrs. W., a sister of the above, multipara, aged thirty, had been in a previous labor delivered, by Dr. McClellan, of Brooklyn, of a living child by version; the operation being necessitated by convulsions, due to uræmia. Her urine was sent to me from Schenectady, at the seven and a half-month. It coagulated under chemical tests, and I telegraphed her to come to New York. She did so, and, although her symptoms placed her in the third class, I delayed interference until the end of the eighth month. At that time labor was induced as in Case I. Mother and child did well, the labor only occupying about three hours, and coming on vigorously by use of the dilators alone.

Case III.—Mrs. M., an Irishwoman in the lower walks of life, primipara, in the seventh month of pregnancy. I saw her, in consultation with Dr. J. J. Connolly, on account of the most violent and constant puerperal convulsions, which had continued for four or five hours. She was very œdematous, and between the attacks perfectly comatose. Having no dilators at hand, we used the warm douche for half an hour; then finding the os dilatable, I introduced two fingers into the uterus and performed bimanual version, delivering a still-born child. No fœtal movements had been detected for hours, and the fœtal heart had been inaudible. This woman recovered temporarily, but never got over the renal disease. About three years after this I was called to see her by Dr. Vaughn, who had attended her in another labor. I found her giving all the evidences of uræmia, and suffering from violent mania, from which she died.

Excessive Vomiting.—This condition, usually existing as a morbid state before the fourth month, much more frequently demands abortion than premature delivery. Sometimes, however, it continues through pregnancy, or, as in the subjoined case, develops towards its close. I have met with but one case which has demanded the procedure which now engages our attention. The following notes were kept for me by Dr. Sproat, house physician of Bellevue Hospital:

Case I.—Honora Curtin, an Irishwoman, married, aged about thirty-one, a domestic, was admitted to Bellevue Hospital, June 8th, 1869, and in the absence of Dr. Elliot came under the care of Dr. Thomas, who was replacing him. On entering the hospital, she thought herself a little more than six months advanced in pregnancy, having menstruated last in December, 1868. Four days before entrance the patient was attacked with vomiting, which she at first attributed to abusive treatment by her husband, although she afterward denied it. This vomiting had continued night and day, at intervals of not more than ten minutes. After her admission to the hospital, all nourishment was given by the rectum, as the stomach could retain nothing.

All efforts at controlling the vomiting having failed, and the patient becoming constantly weaker, on the evening of June 10th she was anæsthetized by ether, and premature delivery induced by Dr. Thomas. The os uteri was dilated manually, a single finger being first introduced, and afterward two, which were then separated as widely as possible. The dilatation was completed by the use of Barnes's largest dilator and the child delivered by traction upon the feet. The whole operation was accomplished in twenty minutes. The uterus contracted well, the placenta coming away immediately. The child was alive, but survived only about four hours. The vomiting ceased on the second day after delivery, but the urine when tested gave signs of renal disease. The patient was discharged July 2d, apparently well.

I have met with no other case in which artificial delivery has been accomplished so rapidly as in this. The operation, which was performed in the presence of Dr. Nott, of New York, Dr. Wilson, of Baltimore, and the house staff of Bellevue Hospital, occupied precisely twenty minutes, and was completed without violence, with safety to the mother and child. It is true that the child died in four hours, but, when it is remembered that it was but six months advanced, this is not astonishing.

Placental Apnœa.—In a certain number of women a fatty, calcareous, or syphilitic degeneration affects the placenta one or two months before full term, and in repeated pregnancies destroys the lives of the children. Under these circumstances, where the intra-uterine lung, the placenta, becomes decrepit and inefficient, the indication for premature delivery, which enables the child to breathe by air instead of fluid, to live like a mammal and not like a fish, is very clear. The symptoms which notify the obstetrician when to interfere are: Enfeebled movements on the part of the child, enfeebled heart beat, and approach of the time when previous infantile deaths have occurred.

Commencing Epithelioma.—Pathologists now draw a broad line of distinction between the two great varieties of malignant disease which may affect the tissues of the uterus. First, we have true cancer, the removal of which is useless, because it invariably returns; and second we have epithelioma, which, if removed in its earliest stages, may never return. Either form may develop in the pregnant uterus. If it be the latter which is discovered, it is recommended to empty the uterus and amputate its neck. I have never done this, but, to give a clinical example of its performance, I avail myself of a case presented by my colleague, Prof. Jacobi, before the New York Obstetrical Society, and published in the proceedings *of that body:*

"Dr. Jacobi presented a specimen with the following history: In July last, a woman eight months advanced in pregnancy (primipara) was admitted to the lying-in department of the Nursery and Child's Hospital. As is the rule in that institution, she was examined on admission by the touch and with the speculum. The house-physician, observing through the speculum a peculiar discoloration of the cervix, called the attention of Dr. Jacobi to the appearance. Dr. Jacobi found the cervix short, broad, and soft, the os being patulous, so that the finger could easily reach the os internum and touch the membranes.

"Through the speculum the part presented a grayish-white appearance, resembling the cauliflower cancroid. It bled readily when touched, and quite freely on the removal of a small piece for examination. Under the microscope it was seen to consist almost entirely of cells, mostly large pavement epithelial, and some spindle-shaped and smaller cells, a large amount of granular detritus, and spherical corpuscles enclosed in masses of concentric fibres. There could be no doubt that it was a papillary growth of the kind known as cauliflower excrescence.

"Dr. Jacobi determined to induce premature labor at once, with a view to the removal of the diseased part as soon as possible after delivery. He did not deem it safe to allow the woman to go her full time, lest, on account of the physiological congestion of the womb, and its rapid development at this period, the disease should advance, *pari passu*, and grow to such an extent as to greatly imperil, if not destroy, the chances of entirely removing it. He at once introduced his hand, turned, and delivered, the whole process being accomplished in about fifteen minutes.

"To lose no time, ten days after delivery, Dr. Jacobi proceeded to remove the diseased cervix. It was drawn down with great difficulty, and, with the assistance of Dr. Guleke, he succeeded, after numerous failures and the destruction of several wires, in encircling part of it with the galvano-caustic wire, and removing portions of the diseased mass. When it was no longer possible to remove any more in this manner, the olive-pointed galvano-caustic iron was applied to what remained of the cervix, and its destruction effected in this way. The patient recovered well after the operation, and was seen by Dr. Jacobi only a few days ago. He found, on examination, the cervix entirely gone, the uterus measuring about an inch and five-eighths in length. The cicatrix was smooth and firm, and the general health of the woman quite good. There was not light enough on this occasion for examination with speculum. The patient has menstruated since the operation."

DEATH OF CHILD AND CONSEQUENT SEPTICÆMIA.—When a child dies *in utero* during the latter months of pregnancy, it is often retained, usually without injury to the mother, until full term, and then expelled. So surely may we calculate upon this issue that interference is not considered justifiable. In rare cases, however, great constitutional disturbance is set up and a low grade of blood-poisoning demonstrates its presence. I have met with but one instance of this, which I now give in illustration:

CASE I.—N. P., a handsome young American woman, aged about twenty-five years, the mistress of a gentleman of this city, sent for me at the eighth month of pregnancy. I found her suffering from hectic fever, which came on every afternoon, and which was followed by profuse sweating, which lasted all night, saturating her night-clothes, and exhausting her excessively. Upon examination I found that she carried a child *in utero*, which was evidently still, and, as she positively asserted, had been so for a month. Strongly suspecting that a criminal delivery had been attempted at the seventh month, which had failed to produce expulsion, but succeeded in destroying the life of the fœtus, I refused to interfere, but watched the case for two weeks. At the end of this time, the patient was so much prostrated by constant vomiting, profuse sweating, and recurrent attacks of fever, that I feared to delay longer, and at the eighth and a half month brought on delivery. A putrid child was expelled, upon which I could discover no signs of injury. After delivery, the mother was very ill with obscure typhoid symptoms, but ultimately entirely recovered.

Threatened Death of Child.—I have already stated that in women who habitually suffer from disease of the placenta, and in consequence bear still-born children, the induction of premature delivery is decidedly indicated. If the life of the viable child be threatened from any other cause, the same remark holds true. The following conditions are examples of those which most frequently call for the operation in this connection: accidental hæmorrhage or uræmia existing in such degree as not to endanger the mother, but to jeopardize the life of the child; a blow upon the abdomen; a fall exerting its direct force upon any part of the body, and by contre-coup affecting the uterus and its contents; or any other influence which impairs the safety of the child without seriously implicating that of its mother. I give one instance in which the operation was resorted to for the fulfilment of this indication:

Case I.—Mrs. P., a healthy multipara, had advanced to the seventh month of pregnancy without developing any unpleasant symptoms, when suddenly all those which I have enumerated as bringing a case into my second class under the head of uræmia presented themselves. Dr. Metcalfe, who now saw her with me, agreed in the propriety of limiting our treatment to general means, and keeping the case under strict supervision, until the eighth month was arrived at. Then, if indications pointed to the necessity of delivery, it was to be induced. I saw the patient twice or three times every week, examined the urine regularly, and saw with pleasure that no increase of bad symptoms occurred. About one week before the end of the eighth month, Mrs. P. sent for me and told me that the movements of her child were becoming very feeble, and that she felt sure it was growing weaker daily. I found the fœtal heart almost inaudible, and could discover no movements of the fœtus upon prolonged examination. Dr. Metcalfe saw her on the next day, and, corroborating these observations, advised immediate delivery. We accordingly met at the patient's house at 8 P. M., and, after using the warm douche for half an hour, I introduced the smallest of Barnes's dilators, and in an hour the first stage of labor was accomplished. But the uterus could not be excited to action for a length of time, even by the most energetic urging. Uterine catheterization and the use of stimulating enemata failed to cause the second stage to inaugurate itself. On the next day, however, about 10 A. M., uterine contraction occurred, and a male child was easily and rapidly expelled. To my great disappointment, it was still-born. The fears of the patient had evidently been well founded, and interference had come too late, prompt as it was.

Approaching Death of the Mother.—I beg to draw attention to the fact that I do not, in stating this indication, speak of threatened death or prospective death. From my standpoint I am supposing the mother beyond the hope of recovery, and in such a condition that the vitality which remains to her may be legitimately exhausted in an effort to save the life of her offspring. As examples of this condition I would enumerate the last stages of phthisis, cancer, aneurism of the aorta, Bright's disease (not puerperal nephritis), cerebral disease, etc. In illustration I give the following:

Case I.—Mrs. C., a multipara, weighing about two hundred pounds, forty years of age, and previously in perfect health, sent for me very hastily in the absence from the city of Dr. Metcalfe, her ordinary attendant. I found her in great trepidation, crying, and declaring that she was sure she was going to have a fit, from the fact that she had suddenly been taken with a violent headache, vertigo, ringing in the ears, and disordered vision. The flowers which constituted the carpet pattern were, she said, rapidly revolving, so that she dared not look at them. Her pulse was full and bounding, face suffused, eyes projecting, and vessels of the neck distended. She lived very near my residence, and, obtaining a phial of her urine, I hastened home to test this and get a lancet. In twenty minutes I returned to her house, and found that in the short time of my absence she had had one violent convulsion. This had evidently caused the rupture of one of the vessels of the brain, for almost complete hemiplegia existed. Drs. Edward Delafield and Charles Henschel at this moment entered the room, and with their sanction I drew about a quart of blood from the arm, but Mrs. C. remained comatose and hemiplegic. No other convulsion occurred, all the symptoms pointing to serious organic lesion in the brain, and the patient behaving like one in ordinary apoplexy. Dr. Metcalfe returned in forty-eight hours, and took charge of her, I seeing her occasionally. On the fifth day of the attack it was evident that she was sinking rapidly, and, as the child, which was just at the seventh month of intra-uterine development, was living, it was determined to deliver it. In accordance with this decision, I easily and rapidly dilated the cervix with Barnes's dilators, performed bi-manual version, and delivered a living child, which has since grown to be a large and very vigorous girl. The mother, who was completely comatose and almost moribund at the time of the operation, died in the course of twelve hours. I neglected to state earlier in the history that the urine which I obtained on the day of the convulsion became absolutely gelatinous under heat and nitric acid.

In this case, as we felt sure that a cerebral vessel was ruptured, we did not bring on labor earlier for fear of increasing the effusion. It was finally induced at the expense of the rapidly-failing strength and prospects of the mother, in the interest of the child.

AMNIOTIC DROPSY.—Sometimes the amnion, which ordinarily secretes a limited amount of fluid, takes on excessive action and distends to a dangerous degree the uterus, which, in consequence, interferes with the physiological action of the abdominal viscera, the diaphragm, lungs, and heart. The diagnosis of this condition is always obscure, but in some cases may be made by the existence of a very large and fluctuating uterus, great obscurity in sensation of fœtal movements by the examiner, excessive dyspnœa, and tendency to syncope. The diagnosis being made, the only means by which a continuance and increase of these dangerous symptoms can be avoided is the induction of premature delivery.

PREVIOUS RUPTURE OF THE UTERUS, OR PERFORMANCE OF THE CÆSAREAN SECTION.—After traumatic solution of continuity in the uterine fibres perfect union may occur, and utero-gestation subsequently proceed to full term. But the violent efforts demanded from the uterine fibres for expulsion of the child make the risk of a second rupture very imminent. Where such an occurrence has taken place, therefore, it may become advisable to avoid prolonged effort during the first stage by accomplishing cervical dilatation by means of Barnes's dilators, and during the second by the forceps or bi-manual version.

PREVIOUS DIFFICULTY IN DELIVERIES OF LARGE CHILDREN, OR OF CHILDREN WITH OSSIFIED SUTURES.—When a woman has suffered in previous labors from one of these causes, the induction of labor two or three weeks before full term may alter the entire phase of the process, and avoid dangers for both mother and child, which would otherwise be inevitable.

Excessive accidental hæmorrhage, if not controlled, would prove not only dangerous to the mother, but to the child. When ordinary means do not check it, it wonld evidently be proper to empty the uterus prematurely, in the interest of both patients.

Tumors obstructing the pelvis create in less degree the dangers attaching to deformity of this canal, and, for the same reasons which would warrant premature delivery under these circumstances, it would be indicated here.

This paper has already assumed such proportions that I am unwilling to detain my readers by adding to it, further than to recapitulate the cases reported, and make a few remarks upon the management of the prematurely-delivered child. My experience in the induction of premature delivery extends to thirteen operations. Of these—

2 were performed for deformed pelvis.
4 " " " placenta prævia.
3 " " " uræmia.
1 was " " excessive vomiting.
1 " " " septicæmia.
1 " " " threatened death of child.
1 " " " approaching death of mother.

Of the children, ten were delivered living, of which number two died subsequently; one delivered at the sixth, and one at the seventh month. Of the mothers, one died. Of the three children delivered still-born, two were known to be dead before the operation was performed; and the mother who died was supposed to be moribund before interference was established.

One reason for the mortality of premature children is to be found in their inefficient heat-making powers. If such a child be washed, wrapped in flannels, and treated as one at full term ordinarily is, it may die when a different plan might have saved it. Prevent a child at term from having its animal heat abstracted, and it will supply itself abundantly; but to the body of the premature child extraneous heat must be added to keep it from dying of cold. To carry out this idea practically, I do not allow a prematurely-delivered child to be washed for a week or more, and always keep it during that time in a temperature of from 90° to 95°, thus striving to let it feel as little as possible the change of locality as far as this circumstance is concerned. It is difficult to do this, unless every preparation be systematically made beforehand. The plan which I follow consists in having a tin tub placed within one of larger dimensions, so that from three to four inches may everywhere intervene between the walls of the two. At the upper portion of the piece of tin which holds them together a funnel is fixed, and at the lower end a spigot. Into the former hot water is occasionally poured; and, when renewal is necessary, this is allowed to flow away from the latter. In the inner tub a large supply of cotton or wool is placed, and in this the child is enveloped and constantly kept until all fear as to its power of generating sufficient animal heat has passed away. Within this receptacle hangs a thermometer which indicates the temperature. No difference should be made in the management of the child in the hottest part of the summer. Even if the thermometer ranges at 95° in the room, these precautions are essential. Where it is not convenient to obtain any thing else, an ordinary basket, with bottles of hot water laid in the bottom, and filled with cotton or wool, will answer the purpose of keeping the child warm.

But the prognosis as to the child must always be governed by its intra-uterine age. Little hope should be entertained if the delivery be brought on at or just after the seventh month; almost none should be indulged in before the seventh month, while a child delivered at or after the eighth month, provided its vital forces have not been depreciated by the abnormal state which has necessitated delivery, has, with proper management, almost as good a prospect of life as one arrived at full term.

The end of the eighth month, *i. e.*, the ninth menstrual epoch, is the most favorable time for the induction of premature labor.—T. GAILLARD THOMAS.

LACHRYMAL APPARATUS, Diseases of.—Overflow of tears (lachrymation, epiphora, stillicidium) is caused by excessive secretion, or by some defect in the lachrymal apparatus which prevents the escape of the tears. This defect may exist (1), at the puncta lachrymalia, which may be displaced or obstructed; (2), in the canaliculi, which may be obstructed by stricture near the sac or by foreign body; (3), in the lachrymal sac or nasal duct.

INFLAMMATION OF THE LACHRYMAL SAC is very common; generally caused by stricture of the nasal duct. *Symptoms.*—Lachrymation, presence of a tumor (mucocele) at the inner canthus, which may often be emptied by pressure with the finger, the contents passing upwards through canaliculi, or downwards through nasal duct. The contents of the sac vary according to the character of the inflammation. At first it consists of viscid mucus, which may remain a long time, or may become semi-purulent; in more acute inflammation there is abundant suppuration with swelling of surrounding parts, and pointing either through the skin, when a lachrymal fistula is established, or through the conjunctiva near the caruncle. *Treatment.*—1. Slit up the canaliculus, and so give free exit to contents of sac. This may be done upon Critchett's director, or by passing a Weber's canaliculus knife, or by a pair of delicate scissors. 2. Endeavor to cure the stricture of the nasal duct by passing a lachrymal probe every third day until lachrymation ceases. Various kinds of lachrymal probes are used, as Bowman's, Couper's, Weber's.

FISTULA OF LACHRYMAL SAC frequently occurs in acute inflammation,—a small tortuous sinus between the sac and the skin, from which a continuous oozing of the tears on to the cheek takes place. *Treatment.*—(1) Cure the stricture and restore the mucous membrane to a healthy condition. (2) If necessary, pare the edges of fistulous opening, and bring together by fine suture.

LACHRYMAL GLAND.—Hypertrophy, acute and chronic inflammation abscess, fistula, cysts, sarcoma. Removal sometimes required for disease or for obstinate cases of lachrymation. *Operation.*—Make incision below upper and outer third of the orbital ridge through skin and the fascia; feel for gland with finger, seize with hooked forceps, draw forwards, sever with knife, do not close wound until hæmorrhage has ceased.—H. JULER.

LARYNGISMUS STRIDULUS.—*Natural History.*—A paroxysmal spasmodic disease, in which the muscles of the glottis are contracted, the vocal cords tightly stretched, and the glottis temporarily, partially, or completely closed. The affection depends upon some morbid excitement of the par vagam, direct or reflex. It is only seen in infants, especially during the period of first dentition; in children before the completion of the second year; and, in the great majority of cases, between the fourth and tenth month. During such partial or complete closure of the glottis, the entrance of air into the lungs is impeded or arrested, so that breathing becomes suddenly difficult; inspiration is effected by rapid spasmodic efforts, accompanied with laborious motions of the larynx, during which the child crows like a cock. Congenital predisposition exists, as in many families almost all the children in succession are affected. There are neither symptoms of fever nor of inflammation, but suddenly, and without premonitory warning, except occasional but slight breathlessness or wheezing, *the breathing is performed by* violent and noisy inspirations, with each of which the peculiar squeaking or crowing sound is heard. The eyes become fixed and glaring, and the face is expressive of great distress. The head is thrown backwards, and the spine is bent as in opisthotonos. If the paroxysms persist and recur for any length of time, the face and extremities become bluish or purple. At length the paroxysm terminates by a forcible expiration, generally followed by a fit of crying, when the child, completely exhausted, falls asleep. It is the sudden, violent interruption of respiration by spasm which is pathognomonic of the seizure. There is no cough, and no hoarseness—the par vagum alone is affected, so that croup, or laryngeal catarrh, may not be confounded with laryngismus stridulus, which is therefore also known as "spurious croup." The spasmodic nervous nature of the affection is still more obvious from the fact that in some cases there are also at the same time spasmodic contractions of the fingers and toes, or of the hands and feet; and occasionally general convulsions may occur, and endanger life. In many cases also the thumbs and fingers are forcibly and unvoluntarily inflected into the palms of the hands, and one or two toes, generally the large one and that next it, are, in like manner, forcibly inflected towards the soles of the feet. These motions are attended with feelings of pain, and any attempt to extend either the fingers or toes always causes pain and suffering. Sometimes the affection commences by these spasms of the fingers and toes preceding the crowing inspiration. There is evidence to show that cerebro-spinal irritation is the more immediate cause of the disorder. The irritation which establishes the reflex excitement consists mainly of three kinds: (*a.*) The irritation of teething through the trifacial nerve; (*b.*) the irritation of the gastric intestinal tract by overfeeding or improper food, through the pneumogastric nerve; (*c.*) the irritation of constipation, diarrhœa, or intestinal obstruction, acting through the spinal nerves. These act through the medium of the spinal marrow, and influence—(1.) The constrictor of the larynx, through the inferior or recurrent laryngeal nerve; and (2.) the motions of respiration, through the intercostal and diaphragmatic nerves.

Treatment.—The warm bath, and hot water to the under part of the body, with sinapisms to the extremities, purgative enemata, cold affusion to the head and face; slapping the chest and nates with a wet and cold cloth; exposure to a sudden current of cold air; movement of the arms for artificial respiration, taking care to draw the tongue forwards; the vapor of ether or ammonia applied to the nostrils, and, as a last resource, opening the windpipe, embrace all the appliances for resuscitation of the child. During the intervals of paroxysm means must be taken to prevent its recurrence. These mainly consist of attention to the state of the alimentary canal. A searching purgative is generally called for to clear out the contents of the bowels; calomel, jalap and castor oil are the most useful agents. Belladonna, to the extent of one-sixth of a grain thrice daily, combined with bromide of potassium or of ammonium may be of use. Sinapisms and linaments to the spine are also of use. The diet ought to be carefully regulated. Change of air is generally called for, and the use of the tepid and cold bath must be daily.—WILLIAM AITKEN.

LARYNGOSCOPY }
LARYNGOTOMY } *See Larynx, Diseases of.*

LARYNX, Diseases of.—Acute catarrh (acute laryngitis). Chronic catarrh (including clergyman's sore throat). Œdema glottidis, syphilitic affections, phthisis, cancer, inflammation and necrosis of cartilages, tumors, foreign bodies, "nervous" disorders (including laryngismus stridulus).

LARYNX, ACUTE CATARRH OF. ACUTE LARYNGITIS.—*Causes.* Cold, cold with damp; excessive shouting, speaking or singing; erysipelas spreading inwards to larynx. Mechanical and chemical irritants. Scalds. Acute exacerbations sometimes supervene in cases of chronic catarrh. A layrnx diseased from any cause is more liable to acute inflammation than a sound organ. Spread of a naso-pharyngeal catarrh to larynx. Influenza. Exanthemata, *e.g.*, measles, small-pox, typhoid. *Symptoms.*—Functional derangements, viz., loss of voice or hoarseness. Pain in throat near hyoid bone, perhaps tenderness in that region when swallowing. Tickling in throat. Hacking cough. At first scanty tenacious sputa, afterwards looser and more purulent. If the case progresses unfavorably dyspnœa comes on, and this is liable to sudden and most dangerous increase, during which tracheotomy or laryngotomy may be necessary to prevent asphyxia. The local symptoms are usually much more serious than the general. But more or less fever is present. *Pathology.*—Whole mucous tract of larynx is not always affected. The appearances are like those of mucous catarrhs elsewhere, *i. e.*, swelling, redness, mucous, purulent, or sero-purulent exudation; occasionally, in severe cases, small sub-mucous hemorrhages. The dyspnœa mentioned above, when sudden, is partly or wholly spasmodic. But the most dangerous kind results from great serous effusion in the submucous tissue of the glottis, "œdema glottidis." After death the appearances are much less marked than when shown by the laryngoscope during life. *Diagnosis.*—Hoarseness, and occasionally dyspnœa, indicate larynx as the seat of affection. Laryngoscope will exhibit actual state of organ. Catarrhal laryngitis differs from croup in that, 1, the dyspnœa is not persistent, and varies more; 2, there is no false membrane; 3, there is usually less fever; 4, a known cause and history may point unmistakably to acute non-croupous laryngitis. *Prognosis.*—Very guarded, danger of sudden and fatal dyspnœa. Laryngotomy and tracheotomy, while they avert this danger, introduce others, such as pulmonary congestion. Recovery usually complete, but acute sometimes passes into chronic catarrh. *Treatment.*—Rest in a room of uniform and warm temperature. Atmosphere charged with steam. Hot moist sponge to throat. Low diet. Milk and soda-water. Avoid greasy food. Salt food and saline drinks beneficial. Emetics: ipecacuanha, tartar emetic. Aconite (see Ringer's Therapeutics, p. 399). Diaphoretics. Purgatives. Forbid attempts to speak or whisper. If, in spite of treatment, dangerous dyspnœa should come on, perform tracheotomy. For Œdema glottidis, see below.

LARYNX, CHRONIC CATARRH OF. CHRONIC LARYNGITIS. CLERGYMAN'S SORE-THROAT.—*Causes.*—Same as those of acute catarrh. But in order to produce the chronic affection they have to be applied in a milder form and more persistently; or repeatedly. In addition to these, alcoholism, syphilis, phthisis, and occupations in which the voice is frequently strained, predispose to the affection. So also does a low tone of the nervous and vascular systems. Damp, cold climates. Herpetic diathesis. *Symptoms.*—Hoarseness; weakness of voice; voice also looses its firmness and becomes uncertain, especially in the higher notes. Liability to intercurrent attacks of acute laryngeal catarrh. Catarrh usually affects also the neighboring mucous tract of the pharynx. Direct observation of the pharynx with the unassisted eye, and of the larynx with the laryngoscope, shows the mucous glands enlarged, a dusky, congested mucous membrane, small varicose veins, and a glairy mucous secretion clinging to parts of the region. A troublesome, tickling cough sometimes. Almost always a habit of clearing, or rather of attempting to clear the throat by hawking. Thirst Frequently a hypochondriacal state which exaggerates the subjective symptoms. Often symptoms pointing to the cause of the chronic laryngitis, *e. g.*, signs of alcoholism. *Pathology.*—Inflammatory congestion and eventually thickening of the submucous tissue. Hypertrophy of the mucous glands. A glairy mucous or muco-purulent secretion clinging to the mucous membrane. Rarely ulceration, unless the disease has a specific cause. Varicosities of the small vessels. *Diagnosis.*—

Compare symptoms with those of specific diseases of, and with those of ulcers, and of growths in larynx.—*Prognosis.*—Only good when the causes can be removed or a change of climate can be obtained, or local treatment persistently carried out for a long period by skilled hands. *Treatment.*—Rest for irregular or much speaking or singing. All the ordinary precautions against catarrh, viz:—good thick boots, warm socks, dry clothes, dry lodging, dry climate if possible. Exercise in fresh air without thick covering on throat, but merely a thin tie or handkerchief. Regular habits. Avoid night air. Open bowels. Moderate diet. No stimulants. In a few cases generous diet is beneficial. Gargling with hot (not lukewarm) saline solutions, especially of chlorate of potash; sponging pharynx and glottis with sol. argent. nit. (gr. xx- ℥ j). Inhalations of medicated sprays (especially argent. nit. gr. j-x to ℥ j), or of chloride of ammonium vapor. Painting pharynx with glycerine of tannic acid. The health of the other organs and systems of the body should always be inquired into carefully and attended to. Chloride of ammonium, belladonna, mercury, sulphur, ipecacuanha, antimony, iodide of potassium, are all sometimes beneficial.

Œdema Glottidis.—*Causes.*—Usually some ulceration or deeper affection of the larynx other than mere non specific catarrh, *e. g.*, syphilitic disease of the cartilages, small-pox. Sometimes erysipelas spreading inwards from face. Scalds. The œdema often supervenes quite suddenly in the course of such diseases. *Signs.*—Firstly, there are the symptoms of the original disease, *e. g.*, hoarseness, loss of voice, cough; then gradually or quickly, signifying the occurrence of "œdema," there appears great dyspnœa, almost entirely inspiratory. This assumes a fearful form; and the patient's attitude and expression, as he exerts every muscle to get breath and avoid the strangulation which appears to him imminent, are never to be forgotten. *Diagnosis.*—From croup. The latter occurs in children, but œdema glottidis almost always in adults. On pushing the finger boldly into the pharynx, and feeling behind the back of the tongue, the epiglottis and arytæno-epiglottidean folds may be felt; the former as a median pear-shaped swelling, and the latter as two lateral elastic swollen rolls of distended membrane. In the case where the œdema is unilateral, of course a swelling will only be felt on one side. The swollen epiglottis is sometimes visible. *Pathology.*—The œdema results from what is called collateral fluxion, that is, from the active congestion which is apt to take place near a centre of inflammation, especially an ulcer. Niemeyer aptly draws attention to its analogy with œdema of the prepuce complicating a chancre. The swellings may be pale or red, according to whether effusion or hyperæmia predominates. *Treatment.*—Scarify with a bistoury wrapped round all but the point by lint or strapping. If the case is not urgent, croton oil may be given; and an emetic when there are many moist rales indicating bronchial and pulmonary congestion. Warmth to the extremities. Patient should swallow slowly small bits of ice. Whether the symptoms are urgent or not, he should be carefully watched and surgical assistance be at hand; for tracheotomy may be required very suddenly to save from instant suffocation. When the above plan of treatment does not arrest the disease, perform tracheotomy. The prognosis after operation is hopeful. (See also treatment of Acute Laryngitis.)

Larynx, Syphilitic Affections of. Varieties (A) secondary affections: erythema, condylomata, ulcers; (B) tertiary affections: "papulo-tubercular elevations," ulcers, gummata, perichondritis, necrosis of cartilages. Secondary affections may be suspected from the altered voice, combined with secondary eruptions elsewhere, especially in the fauces. They can be seen with the aid of the laryngoscope and require ordinary constitutional anti-syphilitic treatment, aided, in some cases, by such local treatment as inhalations of calomel vapor, sprays of chloride of am and corrosive sublimate, or applications of nitrate of silver. Fa the voice should be avoided. Tertiary affections of the larynx a destructive and dangerous. The papulo-tubercles affect any part of the laryngeal mucous membrane, and, though occasionally causing dyspnœa, chiefly signify their presence by affecting the voice.

TERTIARY ULCERS of the larynx begin either superficially, or from softened gummata, or from perichondritis. Usually multiple; generally first attack epiglottis. Spread in any or every direction, destroy vocal cords, necrose cartilages. Cause dangerous and suffocating spasms. *Symptoms.*—Hoarseness or loss of voice; in many cases attacks of dyspnœa; coincident syphilitic history and, usually, syphilitic appearance. Swallowing sometimes difficult from tendency of fluids to pass through glottis. *Prognosis.*—In favorable cases, cicatrization takes place; but even then voice remains impaired, and a stricture of larynx may result, seriously impeding respiration. So long as disease is active there is great danger of sudden and fatal spasm. *Diagnosis* has to be made chiefly from phthisis and epithelioma. *Treatment.*—Where there is dyspnœa which cannot be rapidly removed by milder means it is dangerous to delay laryngotomy or tracheotomy. Usually the former operation is to be preferred. Iodide of potassium (grs. x to xx ter die) must be given; cod liver oil, tonics, best hygienic conditions which can be obtained, are indicated. Locally, astringent, stimulant and mercurial applications may be made with the aid of the laryngoscope, *e. g.*, strong solutions of sulphate of copper. McEwen has lately (in *Brit. Med. Journ.* for July 24 and 31, 1880) demonstrated that tracheal tubes introduced through the mouth may be used as a substitute for tracheotomy or laryngotomy in cases both of disease and of operation. Laryngeal strictures have been treated by the passage of metallic and vulcanite instruments (Trendelenberg and Schrotter).

TERTIARY ULCER.	PHTHISICAL ULCERATION.	EPITHELIOMA.
1. Attacks epiglottis first.	Attacks first near arytenoid cartilages.	Usually commences over pharyngeal aspect of arytenoids.
2. Progresses rapidly.	Does not advance rapidly.	Progress slow.
3. Little thickening.	Great thickening.	Irregular thickening.
4.	Granular appearance of posterior surface of epiglottis.	
5. Expectoration thick, tenacious, yellowish.	Expectoration, frothy, thin, muco purulent.	At first thin, often bloody.

LARYNGEAL PHTHISIS.—Vide medical works or special treatises. The diagnosis mainly rests on the co-existence of pulmonary disease and of hectic fever, on the absence of specific disease, such as syphilis, and on the laryngoscopic appearances. The latter may show ulcerations especially at the back of the epiglottis and near the arytenoid cartilages. The disease is tuberculous, though it may be the result of local infection by phthisical sputa passing over laryngeal mucous membrane. Treatment is addressed locally to the ulcerations and chronic laryngeal catarrh (vide above), and generally to the phthisis.

LARYNX, CANCER OF.*—Affects chiefly male sex, and almost always occurs in late middle life. Begins usually on left side. Primary cancer is about as often encephaloid as epithelioma, seldom or never scirrhus. The diagnosis has to be made from laryngeal phthisis and from syphilis. Phthisis causes earlier and more complete loss of voice. Before there is much evident new growth it is next to impossible to distinguish laryngeal

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*See especially: Fauvel's *Traite Pratique des Maladies du Larynx*. Paris; Delahaye; and a review of the same work in *Med. Rec.* vol. iv, p. 476.

cancer from syphilis. There are symptoms analogous to those of cancer elsewhere, viz. :—pain, offensive odor, hæmorrhages, glandular enlargements. *Treatment.*—While the diagnosis is at all doubtful give anti-syphilitic remedies. Afterwards, morphia subcutaneously for pain, carbolic acid inhalations for fetor, atomized solutions of tannin for hæmorrhages. But, above all, tracheotomy, which in Fauvel's cases prolonged life, on the average, two years in epithelioma and nine months in encephaloid. See treatment of Cancer. The results of operation of extirpation of larynx have not yet been encouraging.

Laryngeal Cartilages, Perichondritis and Necrosis of.—*Causes.*—"Catching cold," syphilis, exanthemata. Indirectly, any cause of laryngeal ulceration, for perichondritis may supervene on ulcer of larynx. Patients are usually in a cachetic state. Signs, etc.—Firstly, those of inflammation : pain very great. Then suppuration ; collection of pus may cause intense dyspnœa. Lastly, necrosis of cartilage, which varies from very trifling extent to the loss of whole cartilages. Portions of cartilage are coughed up. Sinuses may form in neck. Cricoid cartilage most frequently affected. The immediate cause of the necrosis is usually separation of inflamed perichondrium rather than inflammation of cartilage itself. *Diagnosis.*—Easy when necrosis, with abscess or sinus, is fully advanced. But earlier stages are accompanied by signs of laryngeal irritation, which may resemble those caused by a foreign body. Use laryngoscope and consider history of case. *Treatment.*—On general principles. Open abscess. Perform tracheotomy if dyspnœa is urgent and dangerous. Treat syphilis if present.

Larynx, Innocent Tumors of.—*Varieties.*—Fibrous and fibro-sarcomatous polypi, adenomata, papillomata, mucous cysts. Fibrous polypi and papillomata are the most common. Other varieties, such as lipomata, occur with extreme rarity. Cancerous tumors are described elsewhere. *Position.*—Very rarely on the posterior wall (where ulcers are very frequent). *Signs.*—Dyspnœa, when the tumor is large enough or so situated as to be liable to get between the vocal cords. When the tumor is above the glottis inpiration is most likely to be obstructed, when below the glottis the dyspnœa may be expiratory. Sensation as if foreign body were in larynx. Sometimes secondary laryngeal catarrh ; cough, hoarseness, aphonia. *Diagnosis.*—Use laryngoscope. *Treatment.*—Removal through the mouth in most cases. Sometimes the larynx has to be opened from the neck, by median division of the thyroid cartilage for instance. In removing through the mouth, snares, écraseurs, laryngeal forceps, guillotines, and even galvanic cautery are used. Of course, the parts have to be made visible by laryngoscope during operation, and no small skill is usually required. See special notice of Laryngoscopy. Puncture cysts. Tracheotomy is done prior to thyrotomy, and may be required, in case of severe dyspnœa from tumor, merely to avert immediate danger to life.

Larynx (Trachea or Bronchi), Foreign Bodies in.—*How they gain entrance.*—Through glottis, or, very rarely, through a wound. Children most liable, from practice of playing with things in their mouths. Laughing or coughing while swallowing : the deep inspirations taken in those actions suddenly draw food into their air-passages. Syphilitic ulceration may impair laryngeal orifice or sphincters. General palsy of the muscles which close the glottis. Palsy of the vocal cords is not in itself enough to cause any danger of entrance of foreign body. *Parts where they lodge.*—Sharp bodies usually stick in larynx, especially in or near the ventricle, or just above the glottis. Of course, only bodies of limited size can pass through glottis. Small smooth, rounded bodies most likely to drop into trachea or bronchi, especially into right bronchus. Septum between bronchi is to left of middle line. Right bronchus is larger than left. *Signs.*—Depend (1) upon size of body, (2) upon its position, (3) upon whether it is impacted or not, (4) upon its nature, whether sharp and jagged, or smooth and rounded. 1. A sufficiently large substance will cause speedy suffocation unless removed. 2. Bodies near the glottis usually cause acute irritation, spasm, cough and choking sensation; perhaps hæmorrhage and pain. Symptoms may be aggravated by each act of swallowing. If not removed, ulceration, catarrh, or even abscess will ensue. Impaction in the trachea causes signs mainly of impeded respiration, but also produces general laryngo-tracheal irritation, and, eventually, inflammation and ulceration. The interference with respiration, as well as the tracheitis, soon affects the lungs. Bronchitis and pneumonia. When a bronchus is the locality, the signs resemble those of foreign body in the trachea; but the pulmonary symptoms are confined to or most marked in one lung. There is decrease or absence of respiratory murmur on the affected side. 3. Bodies lying loose in the air-passages are apt, as they from time to time come in contact with the glottis, to cause sudden and violent paroxysms of choking and dyspnœa. 4. Of course, sharp and jagged bodies produce greater irritation, and cause far greater danger of ulceration, &c., than smooth ones. *Diagnosis.*—The history generally makes this clear. Laryngoscope is very valuable. Lay stress upon the sudden access of the symptoms without warning, and on the absence of fever. Of course, when inflammation has resulted, fever will be present. *Prognosis.*—Most grave, unless the body can be removed. The instances in which substances have remained without producing serious consequences are very rare. Sooner or later disease of the lungs ensues and proves fatal. *Treatment.*—Measures must be taken to remove the foreign body. In some cases the finger suffices to hook away an obstruction partly within and partly without the larynx. In adults, the laryngoscope will sometimes enable forceps, hooks, or loops to be used successfully; and, in children, inversion of the body (applied by Mr. Brunel to himself) should be tried, aided by succussion and by slapping the back. The remaining proceeding is tracheotomy or laryngo-tracheotomy. And, when employing inversion, succussion, &c., the surgeon should always be prepared to do tracheotomy at a moment's notice. If the foreign body is in the trachea or bronchi, do tracheotomy low down. If the foreign body be in the larynx, and cannot otherwise be extracted, the tracheal wound may be extended upwards, even through the thyroid cartilage itself. If, when the wound has been made, extraction cannot, even with the help of inversion and succussion, be effected, the wound must be kept open in the hope that the patient may shortly cough out the body. And a canula must not be worn unless the foreign body is known to be above the wound.

RULES FOR LARYNGOSCOPY.*—1. Position of patient: sitting, body and head erect, knees together, head slightly thrown back. 2. Lamp: in line with patient's ear, nine inches to left of his head. 3. Position of surgeon: opposite patient, with mirror properly adjusted to head and eye. 4. Mouth: wide open. 5. Reflect light upon fauces at correct focal distance of reflector. 6. Warm laryngeal mirror over lamp. Test it against cheek or hand. 7. Direct patient to protrude his tongue. 8. Hold it between thumb and index finger, in napkin (thumb uppermost). 9. Hold laryngeal mirror like a pen. 10. Place its back gently against uvula. 11. Move your hand slightly towards patient's left, so as to keep it out of line of view. 12. Patient to draw a deep breath, and say, "ah," "ur," "eh," or "ee." Be always quiet and gentle; encourage the patient; let each examination be short, even if unsuccessful. Be careful not to hurt patient's tongue, or to burn his mouth, or to push either his uvula or the mirror against the back of the pharynx.

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* *Abbreviated from Lennox Browne.*

Laryngotomy.—Steady larynx between thumb and forefinger of left hand. Make a perpendicular incision through skin and fascia over crico-thyroid membrane, and one inch long. Pass a sharp scalpel through crico-thyroid membrane transversely. In the absence of a canula (*e. g.*, in operations done with a penknife to prevent choking), turn the blade on edge to hold open the wound. In operations done deliberately, of course some tube must be introduced. See Tracheotomy. Tie any bleeding vessel as soon as it is divided.—C. B. Keetley.

LEAD POISONING—*See Saturnism.*

LEPROSY, Italian—*See Pellagra.*

LEPRA. LEPROSY.—*History.*—This disease has been known in Asia and Africa from very early times. At the beginning of the Christian era it was not very prevalent in Europe, but in later centuries it spread over the whole continent and the British Isles, and for several hundred years existed as a much-dreaded scourge. Later again, it gradually disappeared from the more central portions of the continent and from England, and at the present day is only found endemically in Greece, Italy and Spain at the south, and Norway and Iceland at the north, with occasional sporadic cases elsewhere.

It also occurs endemically in Africa, Asia Minor, China, Japan, the Eastern Isles, the Sandwich Islands, Central and South America, the West Indies, and numerous other places within the tropics. In North America it is found in Mexico, Louisiana, California, Wisconsin and elsewhere, and for the past hundred years at Tracadie, in New Brunswick, B. A.

Description and Varieties.—Leprosy is a chronic constitutional affection, characterized by marked and peculiar changes in the skin and other organs of the body. It presents three principal forms, known as the macular, tubercular, and anæsthetic. These are usually associated together in varying degree in each case, although one of them, as a rule, predominates over the other.

Before the disease becomes sufficiently advanced to present distinct and characteristic symptoms, there usually exists a prodromal stage of greater or less duration. During this period the only evidence of ill-health may be a feeling of languor or loss of force, with some mental depression. From time to time a brownish discoloration (macule), or an isolated bulla may be noticed, the first usually healing before the second makes its appearance. Later, the discolored spots become more numerous, and enlarge from the size of a coin to that of the hand, but it is difficult to appreciate with the fingers any thickening or infiltration. The patches at first are of a reddish brown, and as they increase peripherally, their advancing border maintains this color, while the central portions gradually lose it, and fade into a dirty gray, and sometimes to a dead white. Occasionally the macules disappear entirely without leaving any mark. When they first appear they are commonly hyperæsthetic, but as the disease advances this condition gradually disappears, and ultimately the white patch becomes anæsthetic.

In company with the macules, or independently, tubercles may arise. These are thickened elevations of the skin, sometimes quite circumscribed, at other times more diffuse. The tubercles at first may be hyperæsthetic, later becoming anæsthetic. They may appear on any part of the body, but very frequently make the face their favorite seat, locating themselves above the eyebrows, and on the nose, lips and ears. When developed to any great extent, they render the features extremely repulsive and disgusting. The tubercles may persist throughout the whole course of the disease, or, on the other hand, may undergo ulceration, or disappear by interstitial absorption, coincidently with these changes, or later, the mucous membranes of the buccal cavity, nares, pharynx, &c., may present similar lesions.

The anæsthetic form of leprosy may arise as a late stage in the course of a case that in the beginning had exhibited macular or tubercular features only, or it may appear without such previous development. The principal cutaneous lesions met with at the commencement of this form are bullæ. These vary in size, and persist for a short time only. Commonly they rupture and leave a stained surface, which in time becomes the seat of anæsthesia. Hyperæsthetic patches may appear from time to time, and persist for months or longer, and be ultimately succeeded by anæsthesia. The anæsthetic portions of skin may also undergo a certain degree of atrophy, which process may involve the subcutaneous tissues, and result in ulceration, and if situated upon the hands or feet, in caries of the bones of these parts. The distal phalanges are the first to suffer, later the others, so that in time all of the fingers and toes may drop off. In this form, especially, changes in the ulnar nerve, at and just above the elbow, can usually be appreciated with ease, the nerve becoming swollen and tender.

Leprosy runs its course in from five to fifteen years; the patients, if not carried off by some intercurrent disease, usually succumbing to debility, marasmus, or gastro-intestinal trouble.

Etiology.—Further than what may be inferred from the fact that leprosy is frequent in some parts of the world and rare in others, we know very little respecting its immediate causes. Hygienic and climatic conditions have been supposed to be potent in its production; but this can hardly be the case, since leprosy flourishes as freely in Norway and Iceland as in equatorial regions. Hereditary influence is an acknowledged and important factor, though many cases are met with which cannot be accounted for on this ground. The question as to the transmissibility of leprosy from one person to another—in other words, whether the disease is contagious or infectious in any degree or manner—is of vital importance. According to the majority of East Indian medical officers, the disease is *not* contagious; and my own limited observations have tended to sustain their decision. Much evidence, however, has been adduced in support of the opposite view. Upon the whole, the most probable conclusion appears to be that leprosy, like syphilis, is not transmissible by ordinary contact and association, but if the blood or secretions of a leper gain access to the system of a healthy person, the latter may in this way contract the disease.

Diagnosis.—In advanced cases, the diagnosis is plain—although a careless or ignorant observer might perhaps mistake the disease for syphilis. In the earlier stages, before the cutaneous lesions appear, great difficulty might be experienced, especially in countries where the disease is not of frequent occurrence. Even here, however, it is possible that early changes about the ulnar nerve might give a clue to the nature of the disease, which inquiry into the patient's history, former places of residence, etc., might confirm. The macular form might be mistaken for vitiligo, but a careful comparison of the two diseases will not leave the inquirer long in doubt.

Prognosis.—The prognosis of leprosy is, without question, very unfavorable. A few cases appear on authentic evidence to have been cured, a great number have been benefited; but in by far the largest proportion, the progress of the disease has not been stayed.

Treatment.—In connection with the treatment of this disease, the subject of its general prophylaxis claims our first attention. If a given community is to be protected from the spread of leprosy, all cases existing in it should be absolutely separated from the rest of the inhabitants. Each new case, as it appears, should be sent to join the company of unfortunates. There *are at the present time* in the United States probably over fifty lepers. To *prevent their increase, appropriate* national legislation and the establishment of a central lazaretto are undoubtedly required; and the experience of other countries should warn us against deferring the consideration of this matter too long.

In the management of individual cases, hygienic measures are of chief importance. Change to a better climate; more genial or bracing air; sufficient exercise; exhilarating occupation and associations; bathing and cleanliness, with good and nutritious and sufficient food, are recommendations which have been proclaimed from the earliest periods of medicine. The best diet, according to Wilson, would be one of mixed meat and vegetables, with a proportionate supply of good beer.

The principal indications for treatment are, first to relieve the pains incident to the disease; to restore the sensibility to the anæsthetic parts; to heal the ulcerations, if any exist, and to cause the tubercles to disappear. Second, to retard the progress of the disease, and if possible prevent its farther development. To fulfil these indications, a number of drugs and "methods of treatment" have been employed, some of which will now be mentioned.

Calotropis Gigantea, a now comparatively unknown drug, enjoyed a certain reputation in India fifty years ago, in the treatment of this disease. The testimony in its favor is certainly quite strong, and it is surprising, if it possesses even a portion of the virtues ascribed to it, that it is not better known and more generally used. The usual dose of the bark of the root is from one to three grains, two or three times a day.

Hydrocotyle Asiatica was introduced by Dr. Boileau, himself a leper, who claimed to have cured not only himself, but also many others of the disease. My own experience with this drug (though not in leprosy) has satisfied me that it is an active article, which deserves to be farther experimented with.

Anacardium and Hydrarg. Chlor. Corr.—The use of these drugs constitutes the special feature of Dr. Beauperthuy's treatment, the details of which have been published by Bakewell (*Lond. Med. Times*, 1, 70, 550), to whom they were communicated by Dr. Beauperthuy. The bichloride is the principal remedy, given in doses of $\frac{1}{16}$ of a grain twice a day. To remove the tubercles and promote exudation, the oil of cashew nut (product of the anacardium occidentale) is described as a most valuable application, acting slowly but very powerfully. In speaking of Beauperthuy's treatment, Wilson says of the ol. anacardii: "It is especially adapted to tubercles wherever they occur; and one or two applications will sometimes render a surface nodulated all over perfectly smooth, and at the same time remove the more deep-seated hardened knots that are felt in the morbid integument. It has seemed to me, that the exudative process set up by the oleum anacardii performs the office of general derivative or general emunctory to the whole organism; that in fact it represents the copious and continuous discharges which I have already spoken of as flowing from deep-seated ulcers, and which while they last exert so favorable an influence on the general comfort and health of the patient."

Balsamum Gurgunicum.—Dr. Dougal's treatment of leprosy, with this agent, consists in the use internally of a mixture of one part of the balsam and three parts of lime-water, and externally a mixture of equal parts of balsam and lime-water. Great benefit is said to have been derived from this treatment, in spite of the meagre food supplied to the patient.

Oleum Gynocardiæ (Chaulmoogra-oil).—This drug has long been in use by the fakirs of India, and was first introduced to the profession by Dr. Monat, of the Bengal medical service, in 1854, since which time a number of favorable accounts of its use have appeared in the medical press. It is administered internally, in doses or from five to thirty grains, and externally in the form of ointment. In a case of leprosy, at the Charity Hospital under the care of Dr. Sturgis and myself, very decided benefit has followed the use of chaulmoogra.

Hoang-Nan.—This drug reaches us in the form of a brownish woody powder, with an intensely bitter taste like that of nux vomica. Physiological experiments have shown that it is a tetanizing drug, and botanical authority refers it to the strichnos family. A number of writers testify to its utility in leprosy. The drug may be given in doses of two to five grains daily; or,

Alum	1 part
Realgar	1 part
Hoang-Nan	2 parts.

This mixture is made into three-grain pills, of which the commencing dose is one pill daily, to be gradually increased.

An article from the pen of Dr. Labonté, of Mauritius, appeared in the *Edinburgh Med. Jour.*, November, 1880, which gives an unusually hopeful view of the therapeutics of the disease. The general plan of his treatment is to combine alterative medicines with what are commonly called specifics; among others, chaulmoogra oil, the fluid extract of the hydrocotyle asiatica, the siegesbeckia orientalis, cassia occidentalis, etc.

The numerous complications are to be met as they arise, by appropriate remedies, and the observance of strict hygienic rules is insisted on as a *sine qua non*, if lasting relief is to be looked for. The measures which he details, Dr. Labonté says, "have been used with marked benefit to many," and "up to this very moment have not failed" him.

The writer, during the last fifteen years, has had a number of cases of leprosy under his care. As the result of personal treatment, can briefly state, that I have found the pains of lepra controlled by blisters along the course of the affected nerves; that I have seen the tubercles disappear under applications of both ung. potassii iodidi, and of chaulmoogra, and that apparent benefit was derived from the internal use of chloride of barium in doses of $\frac{1}{16}$ of a grain to $\frac{1}{2}$ a grain daily, and that very decided benefit accrued from the internal use of chaulmoogra and hoang-nan.

The study of cases, and the results of the post-mortem examination of a case that died under my care last year, together with other circumstances, lead me to the opinion that the disease first attacks the spinal axis, and then involves the nerves, and later implicates the skin. The earlier changes in the nerves would appear to be of a subacute inflammatory, or rather proliferative character, succeeded by a sclerotic degeneration and atrophy. If this theory of the disease is correct, it naturally follows that, before commencing treatment, we should carefully consider the stage and conditions the disease is in. In the early periods, where we have reason to believe that hyperæmia and irritation of the cord exist, our treatment should be especially directed to their relief. To this end counter-irritation, minute doses of strychnia, or full doses of ergot or bromide of potassium, would seem appropriate. Later, I think that mercury, iodide of potassium, and chloride of barium, would come into play; and still later, when sclerotic degeneration is commencing, strychnia, phosphorus, phosphoric acid, etc., in full doses, and galvanization. This, togther with suitable local treatment, would seem to me far more rational than to follow what appears to have been the usual plan, namely, to select one or two drugs, and make them the mainstay of treatment, irrespective of the stage or grade of the malady. Until we discover a specific for leprosy as we have for syphilis, let us use the same discrimination and care that we would in the management of any other chronic disease.—HENRY G. PIFFARD.

LEPROSY, White—*See Leucoderma.*

LEUCOCYTHÆMIA.—*Natural History.*—In this disease the number of white corpuscles in the blood is greatly increased, with a simultaneous diminution of the red, brought about by chronic exhausting diseases, exposure to cold and wet, or serious acute affections—such as typhus fever, pneumonia, puerperal fever, affections of the lymphatic glands or of the spleen, and is attended sometimes by cough or diarrhœa, epistaxis, hæmorrhagic effusions, furunculous or pustulous eruptions.

The increase of the colorless corpuscles of the blood, which is the prominent character of this affection, does not seem in any case to have existed or occurred by itself. Other morbid states precede, co-exist, or succeed the augmentation of the colorless, the most frequent of which is the enlargement of the spleen, an enlargement so constant that its existence, if not otherwise accounted for, would at once indicate that leucocythæmia prevailed, and would suggest a microscopic examination of the blood. The liver is also frequently enlarged, but not to so remarkable a degree as the spleen. Affections of the lymphatic glands also predominate in some cases, when the elements of the lymphatic glands prevail in the blood, which is then characterized by innumerable round granulated nuclei, generally provided with nucleoli, of the size of the usual nuclei of the lymphatic glands.

There are obvious indications of general ill-health; and the most prominent symptom has been tumefaction of the abdomen, depending upon an enlarged spleen and liver. Ascites and anasarca of the lower half of the body are not unfrequently present; and a tendency to œdema may commonly be observed, the general surface of the body being extremely pale. Transitory pains are frequently experienced in the abdomen. Intestinal disorders are also present, such as vomiting, constipation, or diarrhœa, and jaundice is not unfrequent; but diarrhœa is one of the most dangerous complications, and the most difficult to arrest or control. A considerable amount of dyspnœa may prevail, which cannot be accounted for by elevation of the diaphragm merely. Hæmorrhage often occurs in the form of epistaxis, or from the gums. The disease generally runs a chronic course, and a high degree of emaciation accompanies it. Leucocythæmia is usually well established before it is noticed, and before any remarkable disturbances in the general health have occurred. It is not till towards the fatal termination that any fever sets in, which then assumes the hectic type.

Treatment.—The most varied remedies have been tried, without checking the increased formation of colorless corpuscles; but it is suggested that if it is possible to discover the glandular or splenic affection early, before the alteration of the blood has made much progress, it is probable that the disease may be averted. Tonics, nutrients, and stimulants are indicated, to support the system. The use of the nitro-muriatic bath ought not to be neglected.—WILLIAM AITKEN.

LEUCODERMA.—*Definition.*—A local deficiency or absence of pigment from the skin and hair, developed after birth and slowly spreading, but causing no constitutional disturbance.

Symptoms.—Leucoderma begins by the appearance of one or more round white patches on various parts of the body, generally near brown moles or warts. The patch has a defined margin, bordered by a ring of excessive pigmentation, which gradually merges in the healthy skin, and the hair on the patch is also white, but the affected skin in every respect except the absence of pigment presents no structural or functional difference from healthy skin. As the patches gradually enlarge they become oval, and by confluence form large pale tracts with convex margins bounded by deeply pigmented rings. As time goes on and the white patches spread, more and more of the skin is affected, till finally only a few brown patches with concave edges are left to represent the *normal skin*. The disease may originate at any age, but most frequently after puberty, and is almost always bilateral, though exact symmetry is rarely found.

Diagnosis.—The pale patches of lepra maculosa or lepra anæsthetica may be distinguished from those of leucoderma in that their edges are more shaded, the skin often infiltrated and anæsthetic in the centre as well as scarred, and that they often have a purplish raised hyperæsthetic border, whereas those of leucoderma have a sharply defined border and a dark pigmented ring. The structure and functions of the skin also in the latter are normal.

The concave edges of the dark patches which represent normal skin will enable extensive leucoderma to be distinguished from abnormal development of pigment in a healthy skin.

Prognosis.—Leucoderma causes no pain or inconvenience to the person affected, but the white patches, though they sometimes become stationary, have no tendency to disappear spontaneously or under treatment.

Treatment.—No remedies have yet been found to remove the white patches.—MALCOLM MORRIS.

LEUCOMA—*See Cornea, Opacity of.*

LICHEN.—Under the title of lichen a considerable number of diseases have been described, many of them presenting appearances which differ very widely from each other. Willan includes not only those conditions which will shortly be described, but others which differ in their course as well as in their appearance; thus, "Lichen pilaris" of Willan is more fitly described as a disease of the hair follicles, and is apparently the disease which Devergie called Pityriasis pilaris, while the Lichen agrius and Lichen tropicus of Willan are believed by Hebra to be varieties of eczema. Hebra, indeed, objects to Willan's Lichen simplex, on the ground that it is an acute disease of the skin, but in the following account L. simplex will be retained for the reason that, with this exception, its appearance and course are such as necessitate its association with the other forms which are accepted by Hebra as true lichens. We shall therefore limit ourselves to describing three forms—L. simplex, L. ruber of Hebra or L. planus of Wilson, and L. marginatus, including scrofulosorum.

Definition.—Lichen may be defined as a papular disease of the skin, with more or less local irritation.

LICHEN SIMPLEX.—Lichen simplex is characterized by a group of minute papules, that appear more frequently on the back of the neck and upper extremities, but often on other parts of the body. The papules are acuminated and of a red color, and last a variable time, usually about five or six days. They gradually disappear, and are followed by trifling desquamation. Occasionally slight signs of constitutional disturbance accompany the local symptoms, such as feverishness and headache. Locally an itching or tingling sensation is present at the site of the eruption.

LICHEN RUBER (*Hebra*), LICHEN PLANUS (*Wilson*), LICHEN PSORIASIS (*Hutchinson*).—Lichen ruber of Hebra is comparatively rare in this country. Hebra describes it as "an eruption of miliary papules which are at first distinct from one another, and covered with thin scales." The papules remain the same size during the whole course of the disease. Successive crops of the eruption appear, and thus the papules become aggregated together; eventually they are so closely placed that they come in contact with each other, and in this way are formed "continuous patches of variable size and shape, red, infiltrated, and covered with scales." As the disease progresses the patches extend over different parts of the body, the skin becomes greatly thickened, and when this condition exists over joints their movement is interfered with. Frequently in the folds of the skin, over the joints of the fingers, fissures occur, and extend into the corium, becoming filled with black crusts of blood. The neutral lines and wrinkles about the face disappear, the nails become either greatly thickened, brittle, and of a yellowish brown, or thin and of a light color. The hair of the head, pubes, and axillæ is never affected. This variety itches but little.

Under the name of Lichen planus and Lichen psoriasis Wilson and Hutchinson describe diseases which are probably the same as the Lichen ruber of Hebra. Mr. Hutchinson, in his "Lectures on Clinical Surgery," 1879, says: "Under slightly different names Hebra and Wilson have independently described this disease, and have agreed most closely as to all its main features."

This disease usually presents itself in the form of patches of a round or oval shape, or running in lines, and consists of an aggregation of small round flat-topped papules, some of which may have a minute central depression, which is the opening of a hair follicle. In the earlier stages of the disease the papules are more scattered, but as the eruption develops they increase in number, and have a tendency to become confluent, often forming patches resembling common psoriasis; this, however, never results from the increase in size of the individual papules. The papules are of a livid red, or violet tint, and each is covered with a small thin scale. Often the eruption has at first sight an appearance like herpes, which on closer observation is found to be due to the shiny character of the scales. The patches never are moist, and have no tendency to become ezcematous; but they are aggravated by such forms of local irritation as tight garters. The rash is usually symmetrical, is first noticed on the limbs, but subsequently extends to the trunk, and in many cases attacks the tongue. It is occasionally accompanied by scaliness of the palms and soles. Itching is nearly always a constant symptom, and when present is very severe. The pruriginous condition resulting from the scratching often changes the character of the eruption. A tendency to constant relapses characterizes this variety, and a history of previous attacks is often an important aid to diagnosis. Persons affected with this disease are generally about forty years of age, and are very rarely under twenty. As a rule, there is little or no constitutional disturbance, but the general health may suffer as a result of repeated attacks.

LICHEN SCROFULOROSUM, LICHEN CIRCUMSCRIPTUS, LICHEN MARGINATUS—Although Hebra describes under the name of L. scrofulorosum a variety of lichen which he believes to occur only in scrofulous subjects, there is reason to doubt whether the limitation thus indicated is altogether advisable; at all events, in this country we are accustomed to see cases which answer generally to this description, occurring also in others than scrofulous persons, and differing in certain characteristics to be mentioned hereafter.

In Hebra's variety all the papules appear about the same time in groups; they may vary greatly in color, from that of the normal skin to a deep brownish-red. The shape of the groups is usually circular. The papules undergo no change, and are attended by but little local irritation. The eruption differs in its site from the other forms of lichen in being usually confined to the trunk, and seldom attacking the limbs.

The English forms of Lichen scrofulorosum,—viz., L. circumscriptus and L. marginatus,—occur, as has already been pointed out, in persons who cannot be called scrofulous.[1] The papules are grouped together in rings or patches, and a tendency to the former is very common. On the outer side of the rings the skin is normal, but within the circle is often slightly yellow, whilst the papules themselves are usually red. The eruption grows by extension of the rings, which as they increase in size meet other rings, and the papules disappearing at the point of contact, the so-called gyrate variety is produced. As the papules fade, the skin is left *stained with pigment.* The usual site of this form of lichen is the back and chest. Some amount of itching is always present, which is agravated by flannel vests.

Diagnosis.—The lichenous eruptions have to be distinguished from each other, from psoriasis, eczema, pityriasis rubra, tinea tonsurans, and pityriasis versicolor.

In the early stage it must be noticed that while lichen ruber begins with the development of red papules, which are scattered on any part of the body, but usually on the limbs, and are surmounted by small scales, the papules of lichen marginatus are of a lighter color, are collected together in groups or rings, and appear more frequently on the trunk. Psoriasis begins with the formation of minute papules covered with white shining scales, situated mostly on the extensor surfaces of the limbs, and not aggregated together. Eczema begins with an eruption of small papules and vesicles, the latter containing clear fluid. The papules are never scaly, and are scattered irregularly, usually on the flexor surfaces of the limbs.

Later lichen ruber appears as red patches, consisting of aggregated papules, covered with thin scales. The patches never become moist. In lichen scrofulorosum and marginatus the papules appear in groups, that fade in the centre. In the more advanced stage of psoriasis large patches are formed by the coalescence of the original small spots through growth at their periphery; they are all covered with white glistening, transparent scales, and in eczema the oozing from the surface gives rise to crusts, which are a most important diagnostic sign.

Pityriasis rubra at this stage can be diagnosed by the absence of infiltration, and by the fact that it extends uniformly over the greater part of the surface of the body. In the most advanced stage the eruption of lichen ruber consists of red patches covered with thin scales, the individual papules having disappeared. The skin is thickened, and the nails are affected. Lichen scrofulorosum never attacks the whole surface in the same manner as lichen ruber, and patches or rings rarely become scaly.

In the most advanced stage psoriasis can be distinguished from lichen ruber by the smaller amount of surface affected, and by the fact that healthy skin intervenes between the patches; from lichen marginatus it can be easily diagnosed by the tendency of the rash in the latter to form rings with simply stained skin in the centre. Old-standing eczema can always be recognized by the crusts.

The eruption of pityriasis rubra can only be confounded with that of lichen ruber in the late stage, and can be distinguished from it by the absence of infiltration of the skin and severe constitutional symptoms of the former.

Lichen marginatus may be mistaken for ringworm of the body, but a microscopic examination of some of the epidermis will at once settle the doubt; the same disease may also bear some resemblance to pityriasis versicolor, but this can only occur when the rash is fading, and can be easily distinguished in the same way.

Prognosis.—There is comparatively little danger attending the lichenous diseases seen in this country, although some of them are very intractable, and last a long time on account of frequent relapses.

Treatment.—The treatment of lichen must be both local and constitutional. With regard to the former, the chief aim must be to allay the irritation, so as to afford rest, to remove all sources of irritation, such as flannel, and to apply soothing lotions and ointments composed of such drugs as hydrocyanic acid and weak preparations of tar. It is also necessary to pay great attention to cleanliness. In lichen scrofulorosum the local application of cod-liver oil is stated by Hebra to be of great value, but in applying this remedy care should be taken to keep it in constant contact with the skin. As regards internal remedies for lichen ruber or planus, there are no drugs so valuble as the various preparations of arsenic, but to produce any good result, they must be taken in full doses, and continued for a long period. It must be borne in mind that the use of this remedy must not be abandoned during the intervals of apparent cure, but must be continued with a view to prevent a relapse. If there is any proof of a scrofulous habit, cod-liver oil and iron must be given.—MALCOLM MORRIS.

LICHEN PILARIS.—Lichen pilaris consists in the development of small papular swellings around the hair follicles, and affects the extensor surfaces of the limbs. On the outer side of the thighs, where they are most frequently observed, the skin feels rough and harsh to the touch. The papules, which are about the size of a pin's head, are pale, or only slightly hyperæmic, and do not itch or cause any other subjective sensation.

Treatment.—This consists in washing the skin thoroughly with soap and water, frequent warm baths, and in the inunction of vaseline or some simple ointment.—MALCOLM MORRIS.

LICHEN TROPICUS—*See Prickly Heat.*

LIPOMA }
LIPOMATA } *See Tumors.*

LIPS are liable to congenital deformities (vide Hare-lip), to fissures, chancres, epitheliomata, cysts, nævi, wounds, carbuncles, &c. See general articles, *e.g.*, Tumor, Cystic, &c.

FISSURE OF LIP.—Often syphilitic. Avoid laughing. Touch with argent. nit.; afterwards use weak ung. hyd. nit., cold cream, &c. Antisyphilitic remedies if necessary. Make a shallow cut through the base in obstinate cases.

CARBUNCLE OF LIP is singularly fatal. See Carbuncle.

LISTERISM—*See Antiseptic Treatment.*

LITHOLAPAXY (or Lithotrity, with immediate evacuation). Professor Bigelow, considering that the practice of leaving sharp fragments in the bladder for weeks was more hurtful than the prolonged use of the lithotrite, evacuating catheter and bottle; being struck, moreover, by Otis's emphatic announcements of the great calibre of the urethra—developed this operation. He uses a special lithotrite, an evacuating catheter of a size, if possible, of No. 30 (French), and an aspirating syphon, which stands on a table and communicates with the evacuating catheter by an india-rubber tube. Ether is given, and the sitting may be prolonged for an hour. There are many details to be attended to. Vide a paper by Bigelow, in Clin. Soc. Trans. vol. xii., 1879. Facts so far indicate an excellent future for this operation. See also observations by Sir H. Thompson and Mr. Cadge at the meeting of the British Med. Association, Cambridge, 1880.—C. B. KEETLEY.

LITHOTOMY.—*Definition.*—An operation in which the bladder is cut into for the extraction of a calculus.

Varieties.—Two kinds, viz., supra-pubic and perineal (vaginal in the female). Varieties of perineal lithotomy, viz., (1) lateral, (2) median, (3) bilateral, (4) medio-lateral. Bilateral lithotomy is so rarely employed that we must refer to larger works for a description of it.

LATERAL LITHOTOMY (by far the commonest operation).—*Instruments.*—"Staff," grooved on side or on convexity, lithotomy knife, lithotomy forceps, scoop, bandages or straps to fix ankles and wrists, large metal syringe, sponges, towels, catheter and lint for plugging wound if it should be required. Stool or low chair for operator. Pocket case; anæsthesia; razor and oil to shave perineum. Operation: place patient in lithotomy position, bandaged or strapped (or the legs may be held in position by two assistants). Buttocks to be well over end of table. The stone should be detected whilst the patient is on the table, or else the operation should be postponed. The surgeon sits at a convenient height, with his instruments on a table close by, and an assistant to hand them (the latter should be instructed as to the size and kind of forceps required, &c.). The surgeon passes the staff, and gives its handle to an assistant on the patient's left. This assistant keeps the handle of the staff perpendicular, grasping it firmly, but with the thumb upright. He should keep the concavity of the staff pressed up against the symphysis pubis. Surgeon now incises skin and fat from a point in median raphe one inch and a half in front of anus, outwards and backwards, to midway between anus and tuberosity of ischium. Incision may be extended backwards in ischio-rectal region if necessary. Deepen incision until the groove in the staff can be felt with the tip of the left forefinger. Using the same finger and its nail as a guide, send the point of the knife into the groove in the staff—of course opening the urethra. Next glide the knife along the groove till it reaches the bladder. The passage of the knife into the bladder is recognized by the disappearance of the sense of resistance which is felt when the prostate is being cut, and perhaps also by the escape of urine. As the knife glides along the groove, its handle should be depressed, so that the point of the knife may never leave the groove till it fairly enters the bladder. A neglect of this precaution may result in the knife getting between the bladder and the rectum. Withdraw the knife, "lateralizing" it and deepening the incision in the prostate during withdrawal. In case of a large stone, knife may, during withdrawal, be moved out of groove of staff a little to deepen incision. Insinuate left forefinger into bladder, and as soon as you are perfectly sure that your finger is in the bladder, withdraw the staff, but not before. Take the forceps with your right hand and pass them into bladder, along dorsum of left index finger. When they have reached bladder, open them, and, very likely, the gush of urine which usually now takes place will wash the stone into the grasp of the forceps. If this should not happen, care must be taken in seizing the calculus not to include any vesical mucous membrane, and the calculus should be so grasped that its long diameter may be in a line with the axis of the forceps. In extracting stone, forceps should be pulled in a downward and backward direction, and with a twisting movement. When wound is very deep, blunt gorget may guide forceps into bladder better than index-finger. When calculus is large, finger may be used to dilate incision of prostate and neck of bladder, or a blunt-pointed bistoury may be used to deepen prostatic incision. Sometimes stone can be more easily extracted between forefinger and scoop than by forceps or by finger alone. If stone breaks up, use of scoop and of syringe will be required. If stone is very large, surgeon may have to purposely break it with a strong lithotrite, and extract it piecemeal. When the last-mentioned proceeding has to be resorted to, the prognosis is not very hopeful, not so much from the measure itself as from the state of things for which it has been required. The bladder is now carefully explored, for another calculus or for debris. In case of hæmorrhage, use a plug made like an umbrella, *i.e.*, a piece of catheter with lint or linen tied round it towards one end. This end is passed into bladder, and lint or wadding pushed into the the wound between the lint and the catheter. The whole can afterwards be withdrawn by pulling at the lint. Tie the legs together, and send patient back to bed. The dangers and accidents of lithotomy are (1) hæmorrhage, (2) wounding rectum, (3) missing the bladder with the knife, (4) leaving a calculus or piece of calculus in bladder, (5) pelvic cellulitis, (6) *peritonitis, (7) cystitis, (8)* erysipelas, pyæmia, and other accidents common to wounds in general. Any of the above complications may be fatal. But the great cause of death after lithotomy is pre-existing kidney disease. *After-treatment.*—Merely rest, warmth, cleanliness and careful observation. Oil buttocks and thighs while urine continues to flow through wound.

MEDIAN LITHOTOMY.—Allarton's form of the operation: 1, pass a grooved staff into bladder; 2, place left forefinger in rectum; 3. feel with the same finger for the apex of the prostate; 4, enter a straight knife half an inch in front of anus and direct its point to the urethra, just in front of apex of prostate; 5, with this knife cut upwards a little, dividing small portion of urethra; 6, pass a probe-pointed director into the bladder, and withdraw the staff; 7, gently insinuate finger along this director and dilate (or tear?) prostate with the finger; 9, extract the stone with forceps. This operation is adapted for extraction of foreign bodies.

Several operators, including Buchanan and Teevan, use a rectangular staff when performing lithotomy. At Guy's a "straight" staff is used. N. R. Smith's ingenious apparatus is figured in Erichsen's Surgery, ed. vii. p. 778. For Bilateral and Medio-bilateral Lithotomy, see large works.

SUPRA-PUBIC LITHOTOMY, or "high" operation.—Instruments: scalpel, artery forceps, dissecting forceps, curved staff, or metal catheter, retractors, lithotomy forceps. 1. Incise skin in middle line from pubes upwards, for three inches. 2. Dissect carefully downwards and backwards to reach bladder (which should contain several ounces of fluid), pushing away the peritoneum if necessary, and keeping near the back of the pubes. 3. Depress handle of staff which is in the bladder, so as to raise its point; and open bladder by cutting down on this point. 4. Enlarge incision in bladder towards its neck. 5. Extract with lithotomy forceps. Chief dangers are from peritonitis and urinary infiltration, and they are immensely increased by the bad state of the kidneys, usually found when the calculus is large, and consequently when the supra-pubic operation is done. A soft catheter should be left in the urethra till the wound becomes fistulous. The supra-pubic operation can be done antiseptically.—C. B. KEETLEY.

LITHOTRITY.—Operation, by which a calculus is crushed in the bladder, and the fragments afterwards extracted through the urethra.*

Circumstances under which suitable.—When (1) age is 15 or upwards, (2) stone is less than one inch in diameter (if the other conditions are favorable this limit may be considerably exceeded, (3) it is of soft or friable material, e. g., phosphates, (4) urethra is healthy, (5) bladder and kidneys are healthy, (6) prostate is normal. A combination of the above conditions should make success certain. Noticing each individually, it may be observed that lithotomy is safer when the age is under 15, when the bladder and kidneys are diseased and the stone large or the stones numerous, when the urethra is narrowed by a stricture and the bladder at the same time not very healthy, and when the prostate is so enlarged as to make manipulation of the lithotrite or removal of the fragments difficult. But there are many cases in which the reasons for or against lithotomy or lithotrity are very nicely balanced. The main considerations are, undoubtedly, age of patient and health of genito-urinary organs. A practised lithotritist is justified in crushing where a less experienced surgeon ought to cut.

Operation.—Instruments: lithotrite, Clover's syringe, linen cloth on which to wipe lithotrite, oil, basin of water to receive fragments, warm water to inject if required.

Preparation.—Rest and treatment of vesical irritability, if present, for a short time before day of operation. Bowels to be cleared. Bladder should contain four or five ounces of urine or warm water. Recumbent position. Pillow beneath buttocks. Blankets to keep trunk warm. Warm and oil lithotrite and pass it well into bladder. Be extremely gentle throughout sitting. Seize stone by one of two methods: 1. (Civiale's), in this the calculus is picked up by the lithotrite, just as a bird picks up a pebble with his beak. The following rules are usually followed: I. In case of small or medium-sized stone (1) pass the lithotrite, closed, to the back of the bladder; (2) if the lithotrite has touched or is touching the stone rotate it slightly away from the stone and withdraw the male blade; rotate it back again to a little beyond its original vertical position, and close the blades. The stone will probably be caught; (3) in any other case proceed to find and seize the calculus systematically, thus: 1, withdraw the male blade, then half rotate (45°) the lithotrite to the right, thus / and close; 2, withdraw the male blade, again, then half-rotate to the left \, and close; 3, rotate (90°) to the left horizontal, and close; 4, rotate to the right horizontal. In each case withdraw male blade before rotation, and also depress handle of lithotrite half an inch, so as to slightly tilt up its blades; 5, *6*, search the sides of the floor of the bladder by a still further rotation (135°), first to right, then to left. Before doing this depress handle of lithotrite one inch and a half; 7, having opened the blades, turn them to the inverted perpendicular and close, at same time, depressing handle still further. In this way the lithotrite searches all round its own axis at intervals of 45°, and cannot well miss anything. Every movement is to be conducted with extreme gentleness, and, in particular, the centre of motion, when the instrument is moved at all, should be the prostatic part of the urethra, where serious results would be most likely to follow injury inflicted by rough manipulation. Small stones usually lie towards the back of the trigone. II.—In the case of a large stone, rotate away the blades to open them, as in the cases previously noticed; but do not open the lithotrite by pulling back the male blade; open it by pushing forward the female blade, leaving the male at the neck of the bladder; then rotate towards the stone and seize.

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* Professor Dolbeau's "Perinæal Lithotrity," is outside the above definition. His *operation is really* a combination of lithotrity and lithotomy.

2. *English Mode of Seizing Stone.*—The handle of the lithotrite is raised so as to depress its blades agaiust the base of the bladder. The male blade is then withdrawn, the handle being simultaneously raised a little more. If the calculus does not then fall between the blades, tap the lithotrite lightly in front or on one side, so as to try by the slight concussion to dislodge the calculus. This failing, the blades may be rotated slightly, first to one side, and then, if necessary, to the other.

The stone being seized, rotate the lithotrite a fourth of a turn on its axis before crushing, so as to find if any mucous membrane has been accidentally trapped. Work always as near the middle of the bladder as possible, and always over the same spot. On this spot the fragments will fall, and from it they can be picked up and further crushed, if necessary. No sitting should last more than five minutes.* If pain is produced, the sitting should be cut short. Sometimes one sitting will crush the stone completely. The smaller the stone and the healthier the bladder the longer each sitting may be made and the fewer are the operations which will be required. The first sitting should be shorter than the others. Crush the calculus by a series of short sharp turns of the screw. Usual interval between sittings three or four days. Throughout the process keep the position recumbent, more especially in the interval between the first and second sittings. It is at that time there is great danger of impaction of an angular fragment in neck of bladder or in urethra. When removing lithotrite always previously see that the male blade is pushed home, and that there is no fragment separating it from the female. The fragments and debris may be left to be washed out by the urine, or partly brought away through a silver catheter with a large eye in its concavity; or they may be washed out by means of Clover's syringe.† Finally, before pronouncing the case complete, a most careful exploration of the bladder should be made with a small lithotrite, lest a single fragment should remain to form the nucleus of a new stone. The diet should be rather low, the drinks demulcent and copious, the clothing warm. Morphia suppositories may be useful.

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* *This is the old rule, now upset by* Bigelow's experience and teachings.—See "*Litholapaxy.*"

ACCIDENTS AND COMPLICATIONS OF LITHOTRITY.—1, Impaction of fragments in urethra or in neck of bladder; 2, retention of urine; 3, cystitis; 4, renal irritation, and even supression of urine; 5, orchitis; 6, abscess in prostate; 7, inflammation of veins around neck of bladder; 8, pyæmia; ninthly, may be added effects of culpable clumsiness in operating, *e. g.*, laceration of the urethra or bladder. Impaction of fragments in urethra demands instant treatment. If it occurs near bladder, endeavor to push back fragment with large catheter. If it is nearer the meatus, attempt to extract it with Civiale's urethral scoop, using the greatest care and gentleness. It may be necessary to open the urethra from without. Retention of urine is usually only temporary, and yields to warmth and liq. opii. Cystitis may only be an aggravation of a condition existing before the operation, or it may be due to sharp fragments, or to the atony of the bladder, which in old people may prevent the expulsion of the fragments. It must be treated on general principles, one of which will be to remove the cause. The application of this principle may demand the use of the lithotomy scoop or of Clover's or of Bigelow's syringe, or even the performance of median lithotomy to remove the irritating fragments. The appearance of unpleasant symptoms in the course of a lithotrity case is usually held to indicate a prolonged interval between the sittings. Renal irritation demands cupping to the loins, warmth, purges, &c.—C. B. KEETLEY.

LIVER, Abscess of the.—*Natural History.*—Suppurative inflammation (ending in a circumscribed collection of pus, or in several separate abscesses), is limited to one or to several isolated portions; and, with the exception of congestive turgidness of the contiguous texture, the remaining portions of gland-tissue are rarely implicated. The inflammatory process extends until perforation occurs, or until several contiguous foci or inflamed and suppurating portions unite into one large abscess, or till the pus finds an outlet. The pus is rarely passed into the abdominal cavity; for the adhesive inflammation of the capsule covering the abscess almost invariably occurs, so that attachments form to the abdominal walls and adjoining organs. Frequently the abscess perforates the thoracic or abdominal wall superjacent to the liver, and opens directly outwards. The locality for such spontaneous opening is usually the space below the ensiform cartilage. The pus may also discharge itself into the pelvic, inguinal, or sacral regions, close to the spine. Sometimes the abscess tends, in an upward direction, to penetrate the diaphragm, when it generally empties itself into the right pleural cavity; but more often forces its way into the substance of an adherent right lung, by a distinct suppurative process, and in favorable cases passes by a free opening into a bronchus, whence it is discharged. The stomach, the duodenum, and the colon are the principal abdominal organs into which abscesses of the liver may also discharge.

The symptoms are fever, with repeated rigors, severe headache, and sometimes delirium, but there may be no symptoms pointing to disease of the liver. The difficulties which embarrass the diagnosis of suppurative hepatitis cannot be overrated. In 13 per cent. the disease runs a perfectly latent course, and in only 8 per cent. are symptoms at all well marked. In most cases a correct diagnosis will only be arrived at by not relying upon individual symptoms; but by taking a general view of the mode of origin and entire clinical history of the case, and after excluding, by comparison, the diseases of the liver and the neighboring parts, which may give rise to symptoms similar to those of hepatitis. The most prominent symptoms of hepatic abscess are, however, some tumefaction, pain, or uneasiness of the liver, or of the adjoining parts, as the thorax, abdomen, or right shoulder; an affection of the bowels, as diarrhœa or dysentery; and lastly, pyrexia in a continued, remittent, or intermittent form.

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† See also "Litholapaxy."

The treatment of abscess when it tends its way outwardly, is still an open question as to whether or not an artificial opening ought to be made, the prominences of the false ribs and obliteration of the intercostal spaces being considered sufficient, in the abscence of fluctuation, to justify the operation. In its performance care must be taken to prevent the entrance of air into the abdominal cavity, by the method of opening a lumbar abscess adopted by Professor Lister, of Edinburgh.

Some think it better to allow an abscess of the liver pointing through the abdominal wall to open of itself, for the following reasons: (1.) Because of the inelastic structure of the lobular substance of the liver not permitting the cavity to contract when a free opening has evacuated the pus; (2) because air invariably enters when an artificial opening is made, and rapid decomposition of the pus takes place, and renewed inflammation of the walls of the sac sets in; (3) this renewal of inflammation and fever may end in gangrene, and may thus rapidly prove fatal; (4) when the operation is entirely left to nature, small worm-eaten-like openings serve to discharge the pus, so that it has a slow but constant escape. As these apertures never close up, and as the matter is always oozing out, air cannot enter, no decomposition takes place (no septicæmia occurs), and no secondary fever sets in.

The patient feels no shock from the loss of the matter, which escapes so gradually, and as it escapes the sac contracts and finally closes up. After the abscess has opened strict rest must be enforced. Convalescence is always tedious, and sometimes the cicatrization of the abscess is imperfect, continuing to discharge pus at intervals for years.—WILLIAM AITKEN.

LIVER, Acute Atrophy of the.—*Natural History.*—When simple jaundice, gradually increasing, with sensitiveness over the region of the liver, is followed by violent constitutional disturbances, expressed by pyrexia, headache, delirium, hæmorrhages from various parts, and finally coma; when the liver shrinks to one-half or one-third its normal size, and a peculiar chemical decomposition takes place in it whereby abnormal proximate principles are formed, which, being carried into the blood, may be discovered in various organs of the body, or, passing out by the kidneys, may be found in the urine, the condition is to be recognized as one of acute atrophy of the liver. It seems the result of a form of hepatitis, of the nature of parenchymatous inflammation, already frequently referred to—cloudy swelling of the cell elements, and their subsequent destruction by softening or disintegration, so that the acini are not capable of recognition. The parenchyma is thus relaxed, shrivelled, and flabby, and the liver sinks against the posterior wall of the abdomem. The size of the organ is diminished in all directions, but especially in its thickness.

The symptoms set in, like a bilious attack, with feebleness, rapidly followed by jaundice, pyrexia, and vomiting, delirium supervening by the third or fourth day. The pulse is at first abnormally slow, but at the outbreak of cerebral symptoms it gradually rises to 110 or 120, and presents remarkable variations as regards frequency and volume. Towards the close of the disease it increases in frequency, and becomes smaller and smaller till it can no longer be felt. The body-temperature also rises very high. The cerebral symptoms generally resemble those of uræmic intoxication; collapse increases, perspiration becomes copious, and the patient usually dies comatose about the second day, more rarely about the fourth or fifth day after the first appearance of cerebral symptoms. Such acute atrophy of the liver is apt to be mistaken for typhus fever, complicated with jaundice or with pyæmia. The range of temperature may help to indicate the disease, which is almost always fatal.—WILLIAM AITKEN.

LIVER, Amyloid Disease of—*See Liver, Lardaceous.*

LIVER, Cancer of.—*Ætiology.*—The liver is one of the most frequent seats of internal cancer, which may be either primary or secondary, the latter especially occurring after cancer of the stomach. The disease has sometimes been attributed to injury. Most cases are met with between 50 and 70 years of age, the affection being extremely rare before adult life. In some patients there is a hereditary taint. Dr. Walshe states that hepatic cancer is more common among males, and such has been my own experience.

Anatomical Characters.—Ordinarily hepatic cancer assumes the form of distinct nodules or tuberous masses having characters intermediate between those of scirrhus and encephaloid, approaching more towards one variety or the other in different instances. There is a wide difference as to size and number, the nodules being small at first, and gradually enlarging until they may ultimately reach the dimensions of a child's head, or even attain a larger size than this. Commonly several are found unequal in size, and by their coalescence considerable tracts of the organ are sometimes involved. Originally the shape is spherical, but when the masses reach the surface they become flattened or even depressed in the centre, so as to present shallow concavities or umbilications. As a rule they are not separated from the surrounding tissue by any definite structure, but occasionally a distinct cyst exists around a cancerous mass. Generally the consistence is moderately firm, but it may range from that of a soft, brainlike, semi-fluctuating substance to that of a hard cartilaginous tissue, and the amount of cancer-juice which can be expressed will vary accordingly. The color of a section is in most cases white or yellowish-white, but more or less dotted and streaked with red, on account of the vessels present; it may, however, be extremely vascular and dark red, resembling "fungus hæmatodes." The proportion of cancer-cells and fibrous stroma in any mass, as observed under the microscope, depends on the variety to which it belongs.

The liver is usually enlarged in proportion to the number and size of the growths, being often extremely large and heavy, as well as irregular in shape. Its tissues are more or less destroyed and compressed, the vessels and ducts are encroached upon or obliterated, and as a consequence jaundice and signs of obstructed circulation are often present. Sometimes thrombosis occurs in the portal branches or trunk. New vessels are developed, originating in the hepatic artery. Some observers describe the cancer as beginning in the centre of the lobules, others in the interlobular tissue. When a mass reaches the surface it excites localized peritonitis, with consequent thickening and adhesions. Neighboring tissues may be involved by extension, and the lymphatic glands in the portal fissure are often implicated.

The growth of hepatic cancer is sometimes extremely rapid, especially when it is of the soft variety. Certain changes are liable to occur. The vessels of encephaloid cancer often give way, leading to extravasations of blood into its interior, which afterwards undergo changes, thus giving rise to unusual appearances. Very soft accumulations have been known to burst into the peritoneum in rare instances. Degenerative changes frequently arise in the less rapid forms, in the way of caseation, or of atrophy with contraction, induration, and the formation of a firm cicatrix. A section frequently presents a reticulated appearance, owing to fatty degeneration having taken place.

In exceptional cases hepatic cancer is infiltrated, and the organ may be smaller than usual, as well as diminished in weight. Melanosis, cystic cancer, and colloid have been extremely rarely met with in the liver. More recent and careful observation has shown that some of the morbid growths, generally regarded as being of a cancerous nature, are composed of spindle-celled sarcoma. Cysts derived from obstructed bile-ducts and erectile tumors have also been described in the liver.

Symptoms.—Hepatic cancer is in the great majority of cases characterized by marked local disturbances, but the disease may be latent. At first merely a sense of discomfort and weight is experienced, soon, however, increasing to distinct pain and tenderness, which local sensations frequently become very severe, especially if the growth of the cancer is rapid, or if peritonitis is excited. The pain is often lancinating, shooting either towards the back or shoulders, or over the abdomen. Jaundice or ascites are also common symptoms, being usually the result of obstruction of the main ducts and vessels in consequence of pressure exerted upon them by projections from the liver, or by glands in the portal fissure; ascites may also be associated with chronic peritonitis. Once jaundice sets in, it is usually persistent, and often becomes intense, but it may be temporary from catarrh of the ducts. The spleen is but rarely enlarged. The superficial abdominal veins are sometimes distended.

The physical characters of the liver indicative of cancer are: 1. Enlargement, frequently very great, rapid in its progress, and chiefly increasing in a downward direction. 2. Alteration in shape and irregularity of outline, nodules or larger masses being felt, or sometimes even seen along the surface and margins, which nodules are not uncommonly umbilicated. 3. As a rule considerable firmness and resistance of the projections, though they occasionally have a soft, elastic feel, or even yield a sensation of obscure fluctuation. 4. Occasionally friction fremitus and sounds during breathing, these being chiefly due to peritonitis.

Digestive derangements are necessarily present in most cases, and they frequently first attract attention. The cancerous cachexia is usually well marked, being accompanied with rapid wasting, debility, and anæmia. There may be pyrexia from time to time, which is sometimes considerable when the progress of the disease is rapid. Cancer is frequently present in other organs, either as a primary or secondary formation, especially in connection with the alimentary canal.

The progress of hepatic cancer is generally very rapid, and the disease is rarely prolonged beyond a year.—FREDERICK T. ROBERTS.

LIVER, Cirrhosis of.—*Natural History.*—This chronic form of diffuse inflammation expresses itself by simple or granular induration of the substance of the liver, sometimes called cirrhosis, insterstitial hepatitis, hobnailed or gin-drinker's liver. It commences with interstitial inflammation, leading to increase of the connective-tissue and its subsequent contraction. As a rule the disease only comes under observation when it is more or less completely developed, and when consecutive disorders always associated with it draw attention to the state of the liver. The various morbid changes, which accompany cirrhosis of the liver, may give rise to a long series of functional derangements, which in practice constitute the symptoms of cirrhosis. These are mainly—(1.) Derangements of the chylopoietic organs from impediment to the passage of blood through the portal vein into the hepatic veins, and its stagnation in the radicles of the portal vein; (2.) impairment, passing to complete suspension of the functions of the liver. *Derangements of the stomach,* a loaded tongue, and occasional vomiting *and faint jaundice, are the* earliest symptoms. Digestion continues feeble, and distension and tenderness of the epigastrium, along with heart-burn, flatulence, and constipation are developed. The patients lose flesh and strength, and their color becomes pale or dirty yellow, while the skin is dry and rough. The abdomen becomes distended and fluctuates, but the liver is found reduced and the spleen increased in size, while increasing ascites or tympanites induces more or less dyspnœa. Ascites is the most common and constant symptom, and hæmorrhages from the stomach or intestines are apt to occur as the disease advances, which relieves splenic congestion.

The chief cause of cirrhotic induration is the abuse of spirituous liquors. In other words, it is due to the specific action of alcohol as an irritant or stimulant poison, especially in the form of gin in this country and schnapps in Germany. Alcohol, however, is not the only irritant capable of inducing the proliferation of tissue by cirrhotic or adhesive inflammation. Numerous products of faulty digestion, or of material such as spices taken into the stomach, act as irritants, and other causes are syphilis, and also frequent attacks of intermittent fever. The cirrhosis from syphilis is generally associated with lardaceous disease, and has a characteristic form.

Treatment has the first object of relieving the disorders of functions which mainly threaten life. Absolute abstinence from alcoholic spirits is indispensable, and the diet should consist of mild, simple articles of nourishment, especially easily digested animal food. Coffee, spices, and articles irritant to the liver must be avoided. Swelling and tenderness suggest leeches and fomentations. Mild saline laxatives may be given, and when the tenderness ceases, the bowels may be kept open by rhubarb.

When nausea or vomiting occurs, hydrocyanic acid, hypophosphite of soda, belladonna, morphia, ar extract of nux vomica, are particularly suitable. The gastric and intestinal catarrh require to be subdued by alkaline carbonates. They lessen the viscidity of the mucous secretion. When pain prevails, cupping or leeches are indicated over the liver. Saline purgatives, such as sulphate of magnesia or bitartrate of potash, should also be given, while iced drinks and low diet must be the rule of life.—WILLIAM AITKEN.

LIVER, Congestion of—*See Liver, Simple Enlargement of.*

LIVER, Fatty.—*Etiology.*—This affection belongs to the fatty infiltrations, the secreting cells of the liver becoming filled with oil. The conditions under which it is usually met with are: 1. In connection with phthisis and other wasting diseases, such as cancer, gastric ulcer, or chronic dysentery, 2. In chronic lung and heart affections, which lead to imperfect aeration of blood. 3. As the result of overfeeding, especially excessive consumption of hydro-carbonaceous substances, and abuse of alcohol, particularly in the form of ardent spirits. Deficient exercise and indolent habits aid greatly in the development of the disease under these circumstances. Some individuals are much more predisposed to fatty liver than others. Fatty degeneration of the hepatic cells may be set up in connection with other morbid conditions of the liver, such as albuminoid disease or cirrhosis.

Anatomical Characters.—In well-marked fatty liver the morbid characters include enlargement and increase in weight, though the specific gravity is diminished, the margins of the organ being thickened and rounded, and the surface quite smooth; a more or less yellow color, with opacity, both externally and on section, this being generally mottled with red; softening of the tissue, which has a doughy, inelastic feel, pits on pressure, and readily breaks down or tears; anæmia, but little blood escaping from the cut surface; loss of distinctness of outline of the lobules, and evidence of the presence of much fat, obtained either by the knife, by blotting paper, or by ether. The liver may yield as much as from 43 to 45 per cent. of *oily matters*, which consist of olein and margarin, with traces of cholesterin

Microscopic examination shows enlargement of the cells, which also become spherical, and are more or less loaded with fat. In the less advanced cases the change is only revealed by the aid of the microscope. It is found that the morbid process extends from the circumference of the lobules towards their centre.

Symptoms.—As a rule, there are no evident symptoms connected with the liver in fatty disease. Dyspeptic disturbances are common. Physical examination is the only positive means of diagnosing fatty liver. 1. There is enlargement in a downward direction, slow in its progress, and usually moderate in degree, the organ never attaining any great size. 2. The shape is quite normal, and the surface and margins are smooth and regular, the latter feeling rounded. 3. Palpation often reveals a soft, doughy consistence of the tissue. The general symptoms are frequently those associated with fatty changes, namely, want of tone, inaptitude for exertion, pallor and pastiness of the skin. Signs of fatty changes in other organs and tissues, such as the heart, vessels, and kidneys may be observed.—FREDERICK T. ROBERTS.

LIVER, Hydatid Tumor of the.—*Etiology and Pathology.*—The best illustration of the morbid conditions resulting from the development of the embyro of a tapeworm in the human body is afforded by the complaint now under consideration, and though the parasite may be met with in almost every organ and tissue in the body, yet the liver is by far its most frequent seat, so that the subject may be discussed once for all in the present chapter. A hydatid tumor is derived from the development of embryos of the *tænia echinococcus*, each of which produces a *scolex* named *echinococcus hominis*, and these scolices become inclosed in cysts. This variety of tapeworm infests dogs and wolves, and it is supposed that fragments are evacuated in their excræta, the ova of which are subsequently set free, become mixed with water or food, and are thus introduced into the alimentary canal of a human being. When the embyros are liberated, they bore the walls of the stomach with their hooks, and then migrate, usually settling in the liver. and there developing into scolices. The *echinococcus* also infests sheep, and it is in consequence of eating their organs which are the seat of this parasite, that dogs become the subjects of tapeworm.

Iceland is the country in which hydatid disease is especially prevalent. In this part of the world it is only very exceptionally met with, and usually in persons who have been abroad. Most cases occur during middle life, and among the poorer classes.

Anatomical Characters.—In the first place it will be well to describe the various structures which ordinarily enter into the formation of a typical hydatid tumor: 1. Externally there is a firm, whitish or yellowish, fibrous, vascular capsule, the result of proliferation of cellular tissue from irritation, which is adherent to the surrounding structures. 2. Within this, moulded as it were to its interior, but easily separated from it, is a delicate cyst or bladder, elastic, grayish, semi-transparent or gelatinous in aspect, and compared to boiled white of egg; under the microscope this is seen to consist of several hyaline, concentric layers, a section presenting a characteristic laminated appearance. The most internal layer is extremely delicate, and is studded with minute transparent cells. The term mother sac or vesicle is usually applied to this structure as a whole; but it has also been limited to the internal lamina just mentioned, which has likewise been termed the germinal membrane. 3, A quantity of fluid is contained within this cyst, usually completely filling it, perfectly colorless, transparent, and watery as a rule, occasionally slightly opalescent, of low specific gravity, 1007 to 1009, generally alkaline or neutral in reaction, but occasionally acid, and consisting mainly of a strong solution of chloride of sodium, without any albumen or other organic substance, but said to contain succinate of soda. 4. Floating in this fluid, or attached to the inner surface of the mother cyst when small, are numerous secondary or daughter cysts; in some instances these amount to hundreds or thousands, and completely fill the space, so that there is little or no fluid, and they become flattened by mutual pressure; each daughter cyst has precisely the same structure as the mother sac, and within the larger of them there may be a third generation, and, rarely, a fourth is observed. 5. When the walls of the sacs are examined carefully, little whitish opaque spots are visible on the inner surface, which are the scolices of the *echinococcus* in various stages of development, usually arranged in groups or clusters, but occasionally single. These may also be free in the fluid, rendering it somewhat opaque. Each scolex is very minute, measuring from $\frac{1}{10}$ to $\frac{1}{8}$ of a line in length, but the length and form vary according as the head is retracted into the body or extruded. The head presents a proboscis, four suckers, with a double circle of characteristic curved hooks, which are movable and of unequal length; a constriction separates it from the body, the latter being striated longitudinally and transversely, and presenting posteriorly a depression with a pedicle, by which the animal is fixed to the sac in its early condition. Numerous round and oval calcareous particles are imbedded in the tissue.

In most cases there is but a single tumor as above described, but sometimes two or more are found, though one generally predominates over the others. The size varies extremely, and a hydatid growth may attain such dimensions as to completely fill the abdomen, and even to encroach upon the chest. The daughter cysts usually range from a millet-seed to an egg in size, but subsequent generations are very minute. Originally the shape tends to be spherical. The right lobe of the liver is the most frequent seat of hydatid tumor, but may occupy any part of the organ, being either deep in its substance or superficial. If the hydatids are numerous, large, or superficial, they necessarily alter more or less the dimensions and form of the liver, giving rise to prominences. The surrounding hepatic tissue is often atrophied and compressed; sometimes the healthy portion becomes hypertrophied. Peritonitis may be excited over the tumor, giving rise to thickening and adhesions.

The events which are liable to happen in the course of hydatid disease are important, and may be summed up as follows: 1. The tumor enlarges, displacing adjoining structures and interfering with their functions, until it finally bursts in some direction, or is ruptured by violence or in some other way. The opening may take place externally through the abdominal or lower thoracic wall; into either pleura or lung, especially the right, which is the most common direction; the pericardium rarely; the peritoneum; the stomach or intestines; the gall-bladder or the bile-ducts; the hepatic vein or the inferior vena cava. 2. Inflammation and suppuration sometimes occur, either spontaneously from rapid growth, from injury or operation, or from the entrance of bile. 3. If the hydatid is slow in its progress, it not uncommonly undergoes degenerative processes as it advances in age, and these may ultimately bring about a spontaneous cure. The entrance of bile is supposed sometimes to induce this result. The outer capsule then becomes much thickened, firm, irregular, opaque, and ultimately calcified partially or completely. This impedes further growth, and the contained hydatids compress each other, shrivel and dry up, and finally die. The fluid also thickens and becomes opaque; and, in short, fatty and calcareous degeneration takes place throughout, until there only remains a puttylike debris, in which shreds of the vesicles and hooklets of the echinococci are imbedded, revealing the nature of the mass. Hæmatoidin crystals are often found in it, as well as usually much cholesterin. A cicatrix-like depression may finally be left. 4. Occasionally cysts are found in which there are no echinococci. The name acephalocyst nas been applied to this condition, and it has been regarded as an abortive or sterile form of the parasite, in which development is arrested, or as an earlier stage of its growth.

Allusion may be briefly made here to a very rare form of this disease, named multilocular hydatid cyst. The liver is found occupied by a mass, in some cases as large as a child's head or even larger, consisting of a stroma or cellular tissue, usually altered considerably by fatty degeneration, in which are imbedded cells or alveoli of various sizes, inclosing a gelatinous substance, in which microscopic examination reveals fragments of the laminated membrane of hydatids, hooklets, or occasionally even perfect scolices, as well as abundant calcareous particles. The centre of this mass is very liable to undergo suppuration, thus altering its characters considerably. This arrangement of the tumor has been attributed to the embryos having been deposited in the lymphatics, bloodvessels, or ducts of the liver; or to the absence or early rupture of the external fibrous cyst, so that the parasites are able to grow and migrate in various directions, and may thus enter the different vessels.

Other organs and tissues are not uncommonly the seat of hydatid tumor along with the liver.

Symptoms.—In general terms the ordinary clinical history of hydatid tumor of the liver may be summed up in the absence of morbid sensations referable to this organ, of any interference with its functions, or of constitutional disturbance, while the liver presents a peculiar form of enlargement. The disease may be latent from first to last. Should the growth attain a great size, a sense of local fulness and tension is often felt; and in rare cases jaundice or signs of portal obstruction arise, in consequence of pressure upon the bile-ducts or portal vein, or because the vessels become blocked up by hydatids. Surrounding structures may also be interfered with, especially the diaphragm and respiratory organs. Should the cyst rupture, the consequent symptoms depend on the direction in which this takes place, being in many instances very grave. If the opening is external or into the lungs, characteristic structures may be discharged. The occurrence of suppuration is indicated by the ordinary local and constitutional signs of hepatic abscess.

The physical signs of hydatid tumor demand particular attention. 1. The liver is increased in size, and this is generally the first thing which attracts notice. The growth is as a rule very chronic and imperceptible in its progress, but finally the tumor may attain enormous dimensions, so as to give rise to a general enlargement of the abdomen, or it may encroach upon the chest, causing the right side to bulge. 2. The form of the liver is altered, as evidenced by palpation and percussion, while there is often an evident tumor in some part, especially the epigastrium or right hypochondrium. Smaller prominences are sometimes felt along the margins or surface of the organ, causing lobulation and irregularity. 3. Any prominent hydatid tumor generally feels quite smooth, and more or less elastic or fluctuating. 4. Hydatid fremitus is often elicited very clearly. 5. In any doubtful case it is justifiable to make an exploratory puncture with the aspirator, and thus to remove some of the fluid, the physical and chemical characters of which are quite characteristic. Perhaps some of the microscopic structures might come away at the same time.

It must be remarked that the signs above described are modified considerably by the degenerative and other changes which are liable to occur in a hydatid cyst. The outer wall may feel hard and bony. If a case only comes under observation when the abdomen presents a general enlargement, it is by no means easy in many instances, except by the history, to make out where the growth originated.

The multilocular cyst is said to be distinguished by being nodulated, hard and tender; by jaundice, ascites, and enlargement of the spleen being usually present; and by the tendency in the tumor to inflame and suppurate. The variety may run a very rapid course.—FREDERICK T. ROBERTS.

LIVER, Lardaceous.—*Natural History.*—The existence of a peculiar homogeneous, translucent, albuminoid material in the walls of the hepatic arteries, cells, and texture of the liver, resembling an infiltration, is a substantive disease known by these names. The new material is not found in the blood; and though frequently associated with fatty degeneration, and sometimes described as scrofulous liver, yet it has no necessary connection with either condition. The liver is one of the most frequent seats of lardaceous disease. The following are the general and local grounds for suspecting the existence of this disease—(1) When there is general ill health expressed by marasmus, anæmia, or dropsy, which constitute the primary symptoms in cases otherwise ambiguous, and which may be associated with diarrhœa, vomiting, and cardiac systolic murmur. (2.) In cases where (after examining the blood) such symptoms as are mentioned cannot be traced to lesions of such organs as we have hitherto been accustomed to refer these phenomena. (3.) In cases where the constitution is enfeebled, and health is impaired by ulcerations of bones, syphilis, malarious fever, tuberculosis, malaria. The local indications of lardaceous disease of the liver are—(1.) Uniform enlargement of the organ; (2.) increased consistence indicated by firmness; (3.) association of these characters with tumid spleen and albuminous urine; (4.) association of these characters with any of the general conditions enumerated under. (3.) The prominent general symptoms of this fatal disease being "anæmia,prostration, exhaustion," the condition of the liver, spleen, and kidneys should be investigated in all cases of this nature, and their condition recorded, especially in cases of syphilis, caries, necrosis, and intermittent fever. Death usually occurs by exhaustion.

Treatment.—Iodine and iron are the remedies indicated by the nature of the disease and the circumstances under which it occurs.—WILLIAM AITKEN.

LIVER, Simple Enlargement of.—*Natural History.*—Simple enlargement of the liver, from fulness or distension of its blood-vessels and bile ducts, is expressed in various forms. These may be—(1.) congestion from increased secretion of bile, and its accumulation in the bile ducts; (2.) passive congestion of the hepatic veins or of the portal veins; and (3.) active congestion, chiefly involving the arterial capillaries. By far the most frequent cause of hepatic blood congestion is valvular disease of the heart (soonest in affections of the right side, later in those of the mitral, and latest in those of the aorta); and especially obstruction to the circulation through the right side, interfering with the emptying of the right auricle. These congestions, so far as the liver is concerned, are of a passive kind; and their most marked and constant effect is to produce ascites, with or without anasarca. If such congestions continue long, they lead to bilous contamination of the blood. Congestions of the liver are chiefly brought about by sudden chills, the cold stages of fevers, over-abundant feeding, intemperance in alcoholic or malted liquors. Products of faulty digestion are thus at once carried to the liver, and influence its circulation; and so also does excessive bodily exercise in the heat of the sun. Increased secretion and elimination of bile also leads to enlargement. This condition is brought about by some increased excitement of the liver, as by certain kinds of food or drink; but more especially it is brought about in Europeans by exposure to unusually high ranges of temperature. In summer and autumn it is a morbid state not uncommon in our own country; but to the European on first la in India it most commonly occurs, and in either case it occasions wh termed a "bilious diarrhœa." With excessive secretion of bile, the tient has purging of bilious stools, causing scalding of the anus. The slight sickness just before the bowels act. A bitter taste is felt in the mouth, and the tongue is foul. The liver bulges on account of its swollen condition, accompanied by uneasiness on exploration, or of weight on getting into the erect posture. The countenance and complexion may be pale, sallow, or dusky livid; the tongue coated, the bowels constipated, the appetite defective; and there may be nausea, vomiting, and headache. The pulse is slow, compressible, and irregular, or quick and feeble; and generally speaking, the symptoms are obscure.

Treatment.—Congestions are mainly relieved by a restricted and judicious diet—abstinence from all rich dishes and fermented liquors. Active exercise in the open air, such as riding on horseback especially, must be taken till fatigue is produced sufficient to induce a desire to rest. Plummer's pill at bedtime, followed by a seidlitz powder or Pullna water in the morning, or by the usual black draught, or by compound mixture of senna, or by such saline purgatives as sulphate of magnesia and bitartate of potash, which cause a drain from the portal system of veins, usually give relief. But a purgative dose of calomel, especially combined with compound jalap powder, is of all combinations the most efficient in diminishing congestion of the liver. After its action the local weight, the pain, the fulness, and other symptoms subside concurrently, with copious bilious stools. An active aperient ought to be prescribed every second or third day for ten days or a fortnight after the action of the calomel purgation. In chronic congestion the external use of iodine ointment sufficiently diluted is of service. Two leeches every second day to the verge of the anus, and repeated from ten to fifteen times, also give great relief. Nitro-muriatic acid is also a valuable remedial agent. Taraxicum diminishes abdominal plethora, combined with aloes, colchicum, and ipecacuanha in pill. An electuary, composed of equal parts of sublimed sulphur and the powdered gum resin of guaiacum, in syrup of ginger, will be found a most useful remedy in cases where the congestion of the liver is associated with hæmorrhoids, a form which is extremely common. When dropsy prevails, doses of the diuretic pill, of hydrargyrum, squills, and digitalis (a grain and a half of each ingredient) should be taken night and morning.—WILLIAM AITKEN.

LIVER, Waxy—*See Liver, Lardaceous..*

LOCOMOTOR ATAXY.—*Natural History.*—A peculiar form of apparent paralysis, characterized by unsteady and disorderly muscular movements, but with muscular power entire, and more or less progressive loss of the faculty of co-ordinating power (voluntary and instinctive). There is sometimes temporary diplopia, with unequal contraction of the pupils. The course of the disease is slowly progressive, and the anatomical lesion is generally a degeneration of the posterior columns and horns of the spinal cord and posterior roots of the spinal nerves; sometimes with peripheral structure-change in the cranial nerves, chiefly the second, third, and sixth pairs, in cases where the sight is affected, and, exceptionally, in those of the extremities.

The disease is one of middle life; most common in the prime of life, between thirty five and fifty years of age; it is very rare in youth or old age. It is also more frequent, in a very large proportion, in males than females. It has received various names, some suggestive of its progressive nature from bad to worse, such as Progressive locomotor ataxy; Progressive motorial asynergia; Consumption of the spinal cord; Tabes dorsalis, gray degeneration of the posterior columns of the spinal cord.

The disease is a peculiar one of the nervous system, commencing insidiously, with evidence of disorder of some of the cranial nerves, perversion of sensibility in different parts of the body, ultimately giving place to inco-ordination of motion—always associated with degeneration of the posterior columns of the spinal cord and posterior nerve-roots, but without loss of muscular power or impairment of the intellect. The connecting links between the initial disorders of the cranial nerves (advancing centrically) and the lesions of the spinal cord (progressing peripherally) have not yet been made out.

There is also evidence, both at the commencement and throughout the course of the disease, of localized congestions, expressed by rachalgia and spinal tenderness. The outset of the disease is insidious and slow. Pains, generally ascribed to rheumatism or neuralgia, first attract attention, particularly in damp weather. These pains may be fixed and aching, or darting, piercing, and transitory. Affections of the second, third, fifth, and sixth pairs of cranial nerves, sometimes with headache, give rise to imperfect or double vision, strabismus, or contractions of the pupil, or dilatations, or deafness, are also insidious phenomena which may attract early notice. These several phenomena generally appear at different times and singly, although sometimes several together, and, after persisting for some time, may pass away. Weakness in some of the limbs may supervene, but no actual paralysis. Another distressing harbinger of the disease is incontinence of urine, associated with spermatorrhœa during the night, with a great proclivity to sexual congress, which is no mere impotent desire, but results in effective sexual intercourse. But after a period (of perhaps two years) the emissions on sexual intercourse become hasty, and a gradual loss of sexual desire and the power of erection supervenes. The bladder becomes irritable. Constipation is occasional when the pains are severe, and it always aggravates them. Transient tickling sensations prevail in different parts of the body, such as the lips, nose, cheeks, forehead, with occasional numbness of the feet and arms, and the peculiar feelings of so-called "pins and needles, as if they were asleep." After another long interval (say of two more years), undue fatigue after walking is experienced; the legs give way under the weight of the body, and there is a sensation as if the patient walked on a spring-board and could not keep his balance. These feelings may disappear and return; and eventually cutaneous hyperæsthesia or neuralgia of the skin (one side of the scrotum, testicle, buttock, or external part of thigh), always unilateral, supervenes. Paralysis takes no part in the phenomena; but rather disturbed co-ordination of muscular movements. Motorial inco-ordination, however, may not come on till after a period of several years (four or five) of suffering from such nervous symptoms. The pains then occur very irregularly, and last from a few hours to many days. At times they dart from limb to limb, or from one part of a limb to another; or, fixing on a small circumscribed spot, they give a boring, gnawing, or tearing sensation. The pains leave behind them a stiffness and soreness of the part. There may be atrophy of the optic disc, with contracted pupil ; cutaneous anæsthesia of the soles of the feet, legs, forearms, and lips; the tactile sensibility seems slowly conducted to the sensory centre. There is decided diminution of cutaneous and muscular sensibility. "The floor is no longer distinctly felt by the feet; the foot seems to rest on wool, soft sand, or on a bladder filled with water. The rider no longer feels the resistance of the stirrup, and desires to shorten the stirrup leathers. If the patient also does not see his movements, the power of co-ordination will be still more uncertain; if, while erect, he closes his eyes, he immediately begins to sway about and totter. If he closes his eyes in the horizontal position, he cannot tell the location of his limbs—he cannot tell whether the right foot or leg is crossed over the left, or the reverse." Reflex movements are not excited by tickling the soles of the feet. A painful feeling of constriction, as if by a tight band, is sometimes experienced round the body; and the sensation of "bearing down," in the perineum and rectum, with constipation, prevails. The bladder imperfectly empties itself, and cannot retain the urine after experiencing the desire to void it. The desire to pass it is frequent and imperative, especially during the night. Some degree of paralysis of the bladder is indicated by diminished force in the strain of urine—the jet is not well arched, and drops dribble away after the act is believed to be over. The urine sometimes passes involuntarily. Sexual desire is eventually abolished. The gait is characteristic. The steps are quick, short, and jerking. The leg and foot are well lifted from the ground, but they are thrown spasmodically and forcibly forward, the whole limb being extended. In bringing the foot down, the heel strikes the ground first. As the disease progresses, the limbs are thrown involuntarily to the right or left without purpose, and without the power of restraining in any way their irregular movements. In walking, the eyes are kept fixed on the legs; and a stick is used, over the handle of which a handkerchief may be placed, to increase the surface of contact required by the numbness of the hand. The muscular force remains good, so that efforts to bend or extend a limb against the will can be resisted with strength. Involuntary jerkings of the limbs in bed prevent sleep. It is especially at starting that the patient has the greatest difficulty in maintaining equilibrium.

When muscular inco-ordination of the upper extremities supervenes, the fingers become numb, and objects are handled with increasing clumsiness. The clothes cannot be buttoned, nor small things removed from the pockets by the fingers. If the patient is set on his legs with his eyes closed and his feet close together, although he has muscular power to stand, yet he cannot preserve his body from falling, or guide himself in taking a few steps in the dark or with his eyes shut. He has no idea of the position of his lower extremities except from sight.

The duration of the disease ranges from a few months to thirty years, with a mean duration of seven years in 119 cases whose progress has been observed.

Treatment.—The intercurrent localized congestions in the region of the spinal cord point to topical blood-letting by cupping or leeches, cautiously employed, and perhaps frequently repeated, with persistent counter-irritation over the spine (by blisters, moxæ, actual cautery, or ice), particularly over those parts where there is tenderness or pain. Phosphorus, in the form of phosphates of metals and salts; of diluted phosphoric acid, as a drink in the daily allowance of water; or of phosphate of soda as an aperient, may be given with benefit. Nitro-muriatic acid as a tonic, and cod-liver oil as a dietetic agent, are also of use. Flannel should be worn next the skin, and chills from cold and damp carefully avoided by a chamois leather close-fitting jacket worn over the flannel, and reaching from the height of the clavicles as low as the folds of the nates behind. The diet ought to be of the most nutritious materials which the patient can digest.

Cannabis Indica, belladonna, and codeia give the greatest relief to the pains; croton chloral is also indicated. Nitrate of silver is recommended in doses gradually increasing to half a grain daily.

So long as there is active local hyperæmia, the use of electricity is hurtful. Faradization may be of use in restoring, to some extent, sensibility to the skin, where local cutaneous anæsthesia has prevailed, after which patients seem to walk better for a time; but when used at all, electricity ought only to be employed during the pauses in the course of the disease, *and then with great* caution in the form of a constant current rather than *the induced current, or Faradization.*

Phosphuret of iron and ergot, and sulphur baths are adjuvants, relieving pains and diminishing numbness.—WILLIAM AITKEN.

LOOSE CARTILAGE—*See Joints, Diseases of*

LONG SIGHT (Hypermetropia)—*See Refraction.*

LORDOSIS—*See Spine, Diseases of.*

LUMBAGO—*See Muscular Rheumatism.*

LUNGS, Cirrhosis of.—Chronic or Interstitial Pneumonia—Fibroid Phthisis—*Etiology and Pathology.*—The forms of pneumonia already described may become more or less chronic, but the coudition now under consideration is essentially of this character, and is one in which the affected portion of the lung becomes greatly contracted and indurated, as well as much pigmented, the air vesicles being more or less obliterated, and the bronchial tubes usually dilated. These changes are generally regarded as being partially due to proliferation of the normal interlobular and subpleural connective tissue, and partly to the formation of a nuclear growth, which develops into extensive tracts of fibroid tissue; but some pathologists look upon them as the result of a chronic inflammatory process, or of a fibroid change affecting the walls of the alveoli themselves. There can be no doubt but that in the great majority of cases this disease is secondary to some previous pulmonary affection, being set up in consequence of long-continued irritation. The conditions of which it may thus be a sequel are: 1. Acute croupous pneumonia very rarely. 2. Catarrhal pneumonia frequently. 3. Dilatation of the bronchi, though Dr. Wilson Fox thinks that the fibroid change is then preceded by catarrhal pneumonia 4. Collapse or compression of the lung. 5. Pleurisy, but it is doubtful whether the change can then extend to any depth, unless pneumonia precedes it. 6. Bronchial irritation from inhalation of mineral and other particles, such as steel, coal or stone dust, or cotton. 7. Various forms of local pulmonary mischief, such as the formation of tubercle or cancer; phthisical cavities; pulmonary hæmorrhage or abscess; or injury to the lung. In these conditions the morbid process is localized, and may really be a method of cure.

Some pathologists, however, consider that interstitial pneumonia is in some instances essentially primary, being, as some suppose, the result of a chronic inflammatory process in the interstitial tissue, resembling that which takes place in cirrhosis of the liver; or, as others believe, a direct, idiopathic, fibroid change, degeneration, or substitution in the walls of the alveoli, quite independent of inflammation, which process tends to spread through the lung. No cases bearing out this view have ever come under my own notice.

It is necessary to allude to the relation of dilated bronchi to chronic pneumonia. Doubtless in many cases this dilatation is secondary to the induration; but there is every reason to believe that the former is sometimes the original morbid condition, and gives rise to the fibroid change.

Anatomical Characters.—In the early stage of chronic pneumonia the pulmonary tissue is congested, but it afterwards becomes paler, and may exhibit extensive tracts of a homogeneous-looking, nucleated substance. When the process is advanced, the appearances are very characteristic. The lung is contracted and shrunken; while its tissue is hard and dense, cannot be torn, and creaks on being cut. A section is smooth, dry, and pigmented, often presenting a marble gray aspect; while fibrous bands or masses may be seen traversing the surface, some of the former being probably obliterated and thickened bronchi or bloodvessels. The vesicular tissue is destroyed, but many of the bronchi are usually dilated. The fibrous growths may ultimately become caseous.

The extent of lung-structure involved varies considerably. The chang may be limited at first to the bronchi and the tissue immediately surrounding them; or it may only be visible around morbid deposits or cavities. A peculiar feature of interest is, that the condition is usually limited to one lung, which it may affect throughout, or be confined to its base, apex, or middle part.

The pleura is generally thickened, sometimes extremely so, and its surfaces are adherent. Emphysema is common in unaffected parts of the lungs; and other morbid conditions are frequently seen, of which the chronic pneumonia is a sequel.

Symptoms.—Interstitial pueumonia runs a very chronic course, and its symptoms at first are indefinite, but when it is fully established, well-marked clinical characters may be present. The local symptoms include dragging pains about the sides; shortness of breath; and cough, which is often irritable, but at the same time difficult and ineffectual, or it comes on in fits, attended with the expectoration characteristic of dilated bronchi. The complaint is often attended with general symptoms, viz., very gradual loss of flesh and strength, anæmia, and sometimes nightsweats; but pyrexia is absent as a rule, or it is but slight. After a time signs of obstructed circulation in the right side of the heart and venous system may set

Physical Signs.—These indicate dense consolidation and contraction of the lung-tissue; which may be combined with signs of cavities due to enlarged bronchi, or with other conditions. 1. The chest is more or less retracted on the affected side, often to an extreme degree. 2. Movement is deficient or absent. 3. Vocal fremitus may be increased or diminished. 4. Percussion gives a hard, wooden, high-pitched sound, with marked resistance. Occasionally the sound is tubular in some parts. 5. Respiration sounds differ in different parts, being weak or absent, bronchial, tubular, or occasionally cavernous, owing to the presence of dilated bronchi or cavities. After a cough the breath-sounds are frequently heard where previously absent. 6. Various rales may be audible in the dilated bronchi. 7. Vocal resonance is variable, being deficient, bronchophonic, or occasionally pectoriloquous. 8. The heart is often displaced towards the affected side; the opposite lung is enlarged and encroaches in this direction; and the diaphragm, liver, or stomach may be drawn up.

Treatment.—The management of chronic interstitial pneumonia is really that of a certain form of phthisis. Nourishing diet is necessary, with tonics, iron, and cod-liver oil. Counter-irritation is often useful, especially by means of tincture of iodine. Iodide of potassium has been recommended internally, for the purpose of promoting absorption, but it is of very questionable value for this end. Cough must be alleviated, and expectoration improved, by means of the usual remedies. The patient must be warned against unnecessary exertion if the disease is extensive, as this is sure to bring on shortness of breath.—FREDERICK T. ROBERTS.

LUNGS, Congestion of.—These morbid conditions may be considered together as they are in many instances but stages of the same process.

Etiology.—Hyperæmia of the lung may be active, mechanical, or passive. Active congestion results from: 1. Increased candiac action from any cause. 2. Probably hypertrophy of the right ventricle sometimes. 3. Irritation set up by certain conditions of the air inspired, or by morbid formations in the lungs. 4. Various pulmonary affections which interfere with the capillary circulation in some parts of the lungs, in consequence of which the vessels of other parts become overloaded. 5. Inflammatory pulmonary diseases, of which congestion is the first stage, and which it often accompanies. 6. Obstruction to the entrance of air into the lungs during inspiration, and hence rarefaction of the residual air, with diminished pressure on the vessels. The causes of mechanical hyperæmia are: 1. Some cardiac disease in the great majority of cases, interfering with the passage of blood through the left cavities of the heart, especially mitral disease, but probably also a feeble and dilated condition of the left ventricle. 2. Very rarely a tumor pressing on the pulmonary veins. Passive congestion is most frequently observed in connection with low fevers and other conditions which greatly depress the action of the heart, and disturb the capillary circulation, especially in aged and feeble individuals; it is seen chiefly in dependent parts, usually the bases and posterior portions of the lungs, on account of the influence of gravitation, and the congestion is then termed hypostatic. Probably it may also arise in connection with a very weak dilated right ventricle.

Pulmonary œdema is as a rule the result of long-continued or intense congestion from any cause, but especially when this is associated with cardiac disease. It may be but a part of general dropsy.

Hæmorrhage into the lungs may occur under the following cirumstances: 1. As a result of congestion. 2. From the lodgment of an embolus in one of the branches of the pulmonary artery. This embolus is usually associated with cardiac disease, and is detached from a clot in the right ventricle, but it may be conveyed from more distant parts. 3. From a diseased condition of the branches of the pulmonary artery. This often materially aids in the causation of pulmonary hæmorrhage. 4. As a consequence of injury to the lungs or chest. 5. In connection with pulmonary diseases, such as morbid growths, cavities, or ulceration in the lungs, particularly in cases of phthisis or cancer. 6. Owing to some morbid condition of the blood, such as that associated with scurvy, purpura, or malignant fevers.

Anatomical Characters.—Hyperæmia of the lung gives rise to a more or less deep-red color, which may become bluish, purple, livid, or blackish-red. The part affected is enlarged, relaxed, and moist, crepitates imperfectly, and a quantity of aerated bloody fluid escapes from its tissue on section. Pieces of congested lung float in water. In extreme cases the vesicular structure is scarcely apparent, and the tissue breaks down very readily, this condition being termed splenification. Hypostatic congestion may end in hypostatic pneumonia.

Œdema is necessarily chiefly observed in dependent parts, and is always present more or less when the lungs are congested. The lungs are enlarged, tense, and do not collapse when the chest is opened; while they have a peculiar feel, and after pressure retain the impression of the finger for a time. The tissues are very moist, and on section a large quantity of serous fluid escapes, either red or colorless according as the œdema is associated with congestion or not, and it may or may not be frothy. The lungs are either congested or pale and anæmic.

Hæmorrhage is described as occurring under four forms, viz.: 1. Circumscribed or nodular—Hæmorrhagic infarction or pulmonary apoplexy. 2. Diffuse or true pulmonary hæmorrhage. 3. Interlobular. 4. Petechial, in connection with blood diseases. The last two are very rare, and do not call for further notice.

Hæmorrhagic infarction is due to embolism, and the blood comes from the capillaries of the pulmonary artery, collecting within, as well as outside the alveoli and minute bronchi, but there is no laceration of tissue. The size of an accumulation varies considerably, depending upon that of the branch of artery obstructed, and it may measure from half an inch to four inches or more in diameter. When situated in the interior of the lung, the infarction is large ; when near the surface it is small and wedge-shaped or pyramidal, with the base projecting outwards a little beyond the surface. The most frequent seats of infarction are the interior of the lower lobe and the vicinity of the root of the lung, but at the same time there may be others more superficial, and they are often numerous. Each hæmorrhage is circumscribed and defined, and it may only correspond to a single lobule, but the surrounding tissue is congested and œdematous. The infarctions feel very firm and hard; a section presents a solid, airless, slightly granulated, dark-red, or blackish appearance, while coagulated blood can often be scraped away, and then the lung structure may become perceptible.

Apoplectic clots in the lungs are liable to the usual changes, and the blood may ultimately be completely removed, the tissues being restored to their normal condition. In many cases a permanent blackish, pigmented knot is left. Pneumonia is sometimes excited, or an abscess may form, the clot softening in the centre; or it may undergo caseous or calcareous degeneration, and become subsequently encapsuled.

In the diffuse form of hæmorrhage, a vessel of some size gives way, the lung-tissue being lacerated, and an irregular potential cavity being formed, varying in size, and containing a mixture of fluid and clotted blood. The pleura may rupture, the blood consequently escaping into its cavity.

In cases of hæmorrhage into the lung in connection with hæmoptysis from phthisis, Dr. Reginald Thompson* has described two classes of anatomical appearances, which deserve notice. The first consists of well-defined circumscribed nodules, of an oval or round form, in color varying according to their age from blood-red to yellowish-red and white, in size ranging from an eighth of an inch to an inch, but being generally about half an inch in diameter, marked in their centre with the openings of two or more bronchioles, which are usually surrounded or spotted with pigment; they have a slightly granular surface when red, but when white or firm, tough, unyielding, and hard. They show a marked tendency to separate around their circumference from the lung-tissue which surrounds them. These nodules are usually regarded as pneumonic, but Dr. Thompson believes that they are altered blood. Moreover he considers that they are not the results of a hæmorrhage *in situ*, for they may be found in the lung opposite to that which is the source of the bleeding. Nor are they due to the simple gravitation of blood dribbling downwards, as they are found in the apex of the lung. The localities which they occupy are sometimes the upper lobe, where they run into each other and occasionally form rather large masses; the base being often found close to the periphery of the diaphragmatic surface, and sometimes only in a narrow region corresponding to the arched part of the diaphragm; and the anterior axillary border close to the periphery, in the region of the nipple, or between the third and fifth ribs. Dr. Thompson regards these nodules as due to the forcible impaction of clotted blood, driven from a distance into the bronchi and alveoli by forced inspiratory efforts. The second group of appearances arise from hæmorrhage *in situ*, of some violence, and producing laceration and contusion of the lung-tissue. They consist of irregular blackened patches, sometimes of considerable size, as much as two inches and a half across, which may be found in the upper part of the lower lobes, or irregularly placed in the upper lobe. They are formed of calcareous matter, loosely coherent, mingled with the black pigment of old blood, and surroonded with a defined but irregular envelope of some thickness, which is deeply pigmented with the same black granules. Occasionally the yellow coloring matter, which is often found in old blood clots, is observed scattered about.

A few remarks may be made here with reference to a condition known as brown induration of the lung. This follows long-continued pulmonary congestion, especially that due to mitral disease, and it is characterized by the accumulation of granular yellowish pigment, probably of the nature of hæmatoidin, in enlarged epithelial and granular cells, which collect in the alveoli, accompanied with varicose dilatation of the capillaries, and probably thickening of the alveolar walls. The pigment may become black, and may finally be found free. The lungs are increased in bulk, and do not collapse; they feel heavy, compact, and inelastic, and present a yellowish tint, passing into brown or reddish-brown. On section, in addition to the general change of color, red spots are seen, shading into black, and a brownish fluid may be expressed. Various degrees of the change are observed, and the extent of tissue affected differs much in different cases, while infarctions are often present at the same time.

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* *Medico-Chirurgical* Transactions, vol, lxi, p.253.

Symptoms.—The symptoms resulting from pulmonary congestion and its consequences are not easy to define, as they are usually only exacerbations of previously existing phenomena. One of the most obvious is dyspnœa, either coming on for the first time, or being more intense than before, and sometimes amounting to orthopnœa. A feeling of tightness or oppression is often experienced across the chest, but pain is generally absent. There is more or less cough, which in pulmonary œdema is attended with very profuse watery expectoration; and when hæmorrhage takes place, a variable quantity of blood is usually discharged, which may have a dull brownish or bistre color, or be almost black. If a clot excites inflammation, pyrexia and other symptoms indicating this complication will supervene.

Physical signs.—1. Respiratory movements are often diminished. 2. Percussion-sound may be at first abnormally clear in pulmonary congestion; but afterwards becomes more or less deficient at the bases. There may be localized dulness in connection with hæmorrhage. 3. Respiratory sounds are usually weak and harsh; over the seat of hæmorrhage they may be bronchial. 4. Œdema is characterized by abundant, small, liquid, bubbling rales; localized moist rales may also be perceptible over the part of the chest corresponding to pulmonary hæmorrhage, and here signs of pneumonia or abscess may ultimately be detected. 5. Vocal fremitus and resonance may be increased or diminished, but are quite unreliable.

Prognosis.—As a rule the affections now under discussion are serious, and they often increase the gravity of the prognosis considerably, because they complicate other conditions.

Treatment.—Much will depend on the exact nature and extent of the morbid changes; and on the conditions which cause them, or with which they are associated. Free dry-cupping of the chest is often very useful in pulmonary congestion, and sometimes local removal of blood is indicated. It is important to attend to position, and to keep the patient at rest. Good diet, tonics, and stimulants are frequently necessary. Care must be taken in cases of œdema that the fluid is not allowed to accumulate in the lungs. In diffuse hæmorrhage astringents are required. Remedies which act upon the heart and vessels may be of much service, especially digitalis.—FREDERICK T. ROBERTS.

LUNGS, Emphysema of the.—Two primary forms of this affection are met with, named respectively vesicular and interlobular. Vesicular emphysema is characterized by an enlargement of the air vesicles, resulting either from their excessive distension, from destruction of the septa, or from both causes combined. Interlobular emphysema signifies the presence of air in the subpleural and interlobular cellular tissue, which is usually the consequence of rupture of the air vessels.

1. VESICULAR EMPHYSEMA.—*Etiology and Pathology.*—Within the definition of this morbid condition as above given, cases are comprised which differ considerably in their clinical aspects and importance. They may, however, be arranged in four groups, though these are more or less conjoined, viz., (1) Acute emphysema, either general or local, (2) chronic hypertrophous or "large-lunged," (3) chronic limited, (4) atrophous, or "small-lunged." It will be convenient to consider first their etiology as a whole, and then to indicate the special causation of each individual form.

Intermediate, Direct, or Determining Causes.—1. Inspiratory theory. According to this view emphysema is the result of excessive or long-continued distension of the air vesicles during inspiration. Thus it is supposed that general emphysema may arise as a consequence of diminished expiratory force, such as that which accompanies the loss of elasticity in the lungs and chest walls in old age, the inspiratory force remaining unimpaired. Hence, the lungs are kept constantly distended, the more so in proportion to the vigor with which inspiration is performed. Again, when portions of the lungs are from any cause, such as pleuritic adhesions, collapse, or consolidation, rendered partially or entirely incapable of expansion, should the chest still enlarge to the usual extent during inspiration, the air which ought to enter these unused portions, passes into other parts and stretches their vesicles unduly. This is named vicarious emphysema. Dr. C. J. B. Williams believes that in this way emphysema is originated in bronchitis, the secretions formed or the thickened mucous membrane obstructing some of the bronchi, and preventing the air from entering the corresponding vesicles, whilst those which are adjacent and have free tubes communicating with them, receive an excessive amount of air. On the other hand, Laennec held the view that the vesicles terminating the obstructed bronchi become themselves dilated, in consequence of air entering during inspiration which cannot be forced out during expiration, hence the emphysema was termed substantive. It has been argued against this theory that expiration is a more powerful act than inspiration ; to which it is replied that a forced expiratory effort has very little influence in emptying the air vesicles, especially if the smaller tubes are obstructed.

2. Expiratory theory.—Sir William Jenner strongly advocates the theory that emphysema is commonly the result of violent expiratory efforts with partial closure of the glottis, such as are carried on during the act of coughing, lifting heavy weights, playing wind instruments, and various other actions. There are certain parts of the lungs which are much less supported and compressed by the chest-walls and surrounding structures than others, and hence they yield under the pressure of air from within, and become distended. This applies especially to the apices, the anterior margins, and the edges of the bases, particularly the left. The tendency to the development of emphysema in this way is greater in proportion to the degree to which the lung is inflated ; to the obstruction to the escape of air through the air tubes ; to the force which is exercised in its attempted expulsion, and to the want of compression and support of the lung-tissue.

Niemeyer laid much stress on the direction of the expiratory force of originating emphysema. He observes "in all these acts (*i. e.*, coughing, straining, etc.) contraction of the chest is effected by vigorous upheaval in the diaphragm. The result is the expulsion of a strong current of air from the lower bronchi, the direction of which is obliquely upward, and if the air be prevented from escaping through the larnyx, a portion of it, in a compressed state, must be driven into the upper bronchi, whose direction is obliquely downward. By the centrifugal pressure exerted, by the air thus compressed, upon the vesicles of the upper lobes of the lung, and upon the adjacent thoracic wall, the latter become distended as far as it is possible for them to yield."

3. Some pathologists are of opinion that emphysema is due to primary nutritive derangement of the walls of the air-vesicles. Villemin describes a "hypertrophy of the elements of the vesicular membrane, causing an extension of this, and an increase in the capacity of the vesicles." As a secondary result of emphysema, nutritive changes in the walls of the vesicles are constantly seen, and should these be impaired in their resisting power, they are far more liable to become distended by any force acting

upon them from within. Hence in old persons one attack of bronchitis will often set up a considerable amount of emphysema, and when chronic bronchitis or pulmonary congestion has existed for a length of time, the resulting alterations in structure render the vesicles much more liable to become distended. Atrophous emphysema is the consequence of a primary degeneration, the partitions wasting and disappearing, several vesicles being thus thrown into one; but in other forms of the complaint, degenerative changes must probably be rather looked upon as predisposing, or "permanence-securing" causes of emphysema, as Sir William Jenner terms them, than as actually determining causes. These morbid changes will be further considered under the Anatomical Characters.

4. Another theory, that of Freund, is, that in some cases there is a primary chronic enlargement of the chest, in consequence of hypertrophy and rigidity of the cartilages, and that the lungs become distended and emphysematous in order to fill up the increased space. This must be a very exceptional cause.

No exclusive theory as to the mode ot production of emphysema can apply to all cases; and in many undoubtedly more than one of the causes just considered has contributed to the development of the morbid changes.

Exciting Causes.—1. Emphysema is liable to arise in connection with several pulmonary affections, namely, bronchitis, especially chronic dry catarrh; consolidation or destruction of portions of the lung from any cause, collapse, or extensive pleuritic adhesions or effusion. 2. Hooping cough is a common cause in children. 3. Croup and other affections which obstruct the main wind-pipe, and excite much cough at the same time, are often followed by emphysema. 4. Cardiac diseases which lead to permanent congestion of the pulmonary capillaries materially aid in its production, by inducing degenerative changes in the walls of the air vesicles. 5. Emphysema may be directly originated by playing wind instruments, excessive effort, lifting heavy weights. straining at stool, climbing hills, and other forms of exertion.

Predisposing causes.—Hereditary influence has been regarded as predisposing to emphysema, especially in those cases in which it comes on during early life, but this is by no means certain. The complaint is by far most common in persons advanced in years. Children, however, often suffer, in consequence of their liability to pulmonary affections, and the weakness of their chest walls. Gouty and fat subjects are said to be predisposed to emphysema.

Special etiology.—The causation of the several forms of emphysema demands brief consideration. What is termed acute general emphysema, which is common in connection with extensive bronchitis, is due to an inability to expel the air out of the lungs, in consequence of obstruction of the bronchi, and it therefore accumulates in the small air tubes and air vesicles, and inflates the lungs. Many authorities object to this condition being called emphysema, and name it insufflation or inspiratory expansion, because there is no actual disease, but merely an inflation of the lungs, which will subside if the obstruction is speedily removed, but if this does not happen permanent emphysema is liable to be established.

The main difficulty lies in determining the mode of production of chronic hypertrophous emphysema following chronic bronchial catarrh. It is regarded by many as being inspiratory in its origin, but Sir William Jenner considers it to be the result of forcible expiration, and explains its general distribution by the fact that as the lungs and chest enlarge, the relative position of the former to the ribs and intercostal spaces becomes constantly changed, so that successive portions of the lung are brought into correspondence with the spaces, and these being less supported than the parts opposite the ribs, they are unduly distended during cough, and thus ultimately the lungs become more or less emphysematous throughout, though the condition is at the same time most marked at the apices and margins, which are least supported of all.

Localized emphysema, whether acute or chronic, is probably as a rule developed during expiration. In some instances it is inspiratory in its origin, being either substantive or vicarious.

Ordinary atrophous emphysema is merely due to wasting of the septa, which become more or less obliterated, so that the vesicles coalesce to a variable degree; in short, it consists in an atrophy of the lung-tissue, usually observed in old age, along with other atrophic and degenerative changes.

Anatomical Characters.—In acute general emphysema the lungs are distended throughout; and do not collapse, or may even bulge out when the chest is opened. The degree of expansion varies much. The lungs appear pale, the capillaries being stretched, and their network enlarged. The bronchi will be found to be more or less obstructed.

Chronic hypertrophous emphysema is also attended with enlargement of the lungs, and on opening the thorax these organs are seen to extend beyond their ordinary limits, often covering the pericardium completely, and they may protrude, or collapse only very imperfectly, this necessarily depending upon the extent of the disease. Though the morbid condition is more or less general, the apices, the anterior borders, and other parts of the lungs which are least supported present the most marked evidences of the change, and the surface is usually more affected than the deeper parts. The emphysematous portions have a peculiar soft feel, compared to that of a "cushion of down," and they retain the impression of the finger, elasticity being impaired. The so-called crepitant sensation of healthy lung is deficient or absent, and on cutting a dull creaking sound is often heard. The affected tissue is pale, bloodless, and dry, but presents irregular spots of black pigment, derived from altered blood contained in obliterated capillaries. The vesicles are seen to be enlarged more or less, varying usually from a hemp-seed to a pea in size, but often many of them are thrown into one, thus giving rise to irregular spaces of considerable size, which are traversed by slender bands, the septa being either visible as slight ridges, or having disappeared entirely. Contiguous lobules may freely communicate, and ultimately nothing may be left but a coarse network. These appearances are best observed after inflating the lung, drying it, and then making a section.

The nature of the changes which the alveolar walls undergo has been much discussed, but there is no reason whatever to suppose that these should be identical in all cases. The violence of the pressure of the air which originates the emphysematous condition may rupture the septa and walls of the air-vesicles directly, but usually their destruction is gradual. They become stretched and atrophied, present perforations varying in size and number, and ultimately only traces of them are seen, or they may disappear altogether. The structural alterations which have been described are the formation of an imperfect fibrous tissue, inducing toughness and thickening, as the result of long-continued congestion (Jenner); or fatty degeneration (Rainey). Dr. Waters, of Liverpool, considers that there is a primary malnutrition of the pulmonary tissue leading to its degeneration, but the exact nature of this he has been unable to ascertain. The elastic and other elementary tissues disappear. The capillaries in the affected part become stretched, narrowed, or obliterated; or some of them may even rupture. Ultimately they are absorbed, and only pigment is left, the remains of the coloring matter of the blood.

In the localized variety of emphysema, the appearances are confined to certain parts, especially the apices and the anterior and lower edges, being similar to those described as characteristic of the more extensive form.

In true atrophous emphysema the lungs are diminished in size, shrink into a very small bulk when the chest is opened, and are very light. The divisions between the lobes are unusually vertical. The pulmonary tissue is pale but much pigmented, dry, and deficient in elasticity. The air-vesicles are enlarged, owing to atrophy of their septa.

Other morbid conditions are often seen in emphysematous lungs, such as bronchitis, collapse in some parts, or, not uncommonly, dilated bronchi. Pleuritic adhesions generally exist. When the emphysema is extensive, the contiguous structures are displaced, and after a time all the organs of the body become the seat of congestion and the changes resulting therefrom. Different statements have been made as to the position of the heart. My own observations would lead me to agree with those who describe this organ as lying with the right border horizontally on the diaphragm, and the apex too much down and to the left. Its right cavities become dilated and hypertrophied in course of time.

Symptoms.—It is only the chronic hypertrophous form of emphysema which leads to any prominent symptoms, and these are chiefly of an indirect character. This condition interferes with the due aeration of the blood, while the pulmonary circulation is obstructed from several causes, but especially on account of the destruction of the capillaries; consequently the right side of the heart is affected, in time becoming the seat of dilatation and hypertrophy, with tricuspid regurgitation; the general venous system also becomes overloaded, and the various tissues and organs are permanently congested, leading to dropsy and important organic changes. The lungs, moreover, are generally the seat of bronchial catarrh or other morbid conditions; and fits of spasmodic asthma, or acute attacks of bronchitis are liable to occur.

Dyspnœa, variable in degree, is the main symptom directly due to emphysema. At first there is merely "shortness of breath" on exertion, especially on going up stairs or up a hill, as well as after a full meal, but ultimately persistent expiratory dyspnœa is experienced, though not accompanied with much distress ordinarily, but rather with a sense of discomfort and uneasiness. It is often relieved by pressing the sides, or by lying on the abdomen. After a meal the breathing is worse, especially should the patient be suffering from dyspepsia, and dyspnœa becomes necessarily much aggravated if bronchitis or asthma should set in. The causes of the dyspnœa are the interference with the respiratory movements, owing to the depressed state of the diaphragm and the rigid state of the chest-walls, the difficulty in expelling the residual air and the small amount of pure air inhaled, and the actual loss of surface fit for aerating the blood. Cough is frequently present, but is chiefly the result of bronchial catarrh, when it is attended with expectoration, otherwise it is dry. There is no pain in the chest directly dependent upon emphysema.

The remaining symptoms which may be observed in cases of emphysema are indirect. Those due to interference with the circulation will be more appropriately described in connection with heart diseases. As the result of the increased respiratory efforts the respiratory muscles often hypertrophy; hence the neck appears to be large. The fat is absorbed, giving rise to emaciation, with strongly-marked features. The symptoms due to imperfect blood-aeration are similar to those described elsewhere only that they are gradually produced; and there is generally apathy and languor, with a flabby and relaxed state of the muscles from this cause.

Physical Signs.—These will necessarily differ much according to the extent and variety of the emphysema, and the morbid conditions with which it is associated. 1. Shape and size of the chest. In general hypertrophous emphysema the chest is more or less enlarged bilaterally, either throughout, or only in its upper or lower part. It may assume a permanent inspiratory form, or even go beyond this, becoming "barrel-shaped" and almost circular. There is often a rounding of the chest in front and of the back behind, but sometimes the change in shape is chiefly observed on one of these aspects. The ribs become more horizontal, and the intercostal spaces wider, in proportion to the enlargement; while the cartilages are frequently quite rigid. In localized emphysema there may be corresponding bulging. Atrophous emphysema is associated with a small chest, the ribs being very oblique, the lower ones almost vertical. 2. Respiratory movements. Expansion is more or less deficient or absent, and there may be merely a general elevation of the chest. Expiration tends to be prolonged. 3. Percussion reveals increased area of pulmonary sound, except in atrophous emphysema; and also in most cases hyper-resonance, with fall in pitch, the sound tending towards a tympanitic character, but being frequently more or less muffled. If the distension of the lungs is extreme, there is deficient resonance, with undue resistance. 4. Respiratory sounds. The most important change usually noticed is the marked prolongation of the expiratory sound, but this is not observed in the atrophous variety. In pure emphysema the breath-sounds are weak, sometimes remarkably so, but of harsh quality. The extent over which they are heard is increased. 5. A crepitant rhonchus is said to be sometimes heard in emphysematous vesicles. Rales due to bronchial catarrh are often present, especially sonorous and sibilant rhonchi. 6. Vocal fremitus and resonance are quite unreliable. As a rule they are deficient. They may be observed over a larger area than usual. 7. There are signs of displacement of organs in cases of considerable emphysema, especially of the heart. Epigastric impulse is common. 8. The veins in the neck often afford signs of obstruction to the circulation, but not in the atrophous form of the disease.

Prognosis.—Emphysema is serious in proportion to its extent. It lays the foundation for a very miserable existence in many cases, increases the tendency to bronchial catarrh, and adds greatly to the danger from an acute attack of bronchitis. Once it is thoroughly established, emphysema cannot be cured.

Treatment.—This part of the subject may be briefly summed up, inasmuch as the principles on which the treatment of emphysema must be conducted need only be mentioned here, the means for carrying these out being described in other parts of this work. 1. Every precaution must be taken against the occurrence of bronchial catarrh, not only on account of its danger, but because each attack tends to increase the emphysematous condition. Other known causes of emphysema must be avoided. 2. It is very important to look to the alimentary canal, as a deranged condition of its functions frequently considerably increases the discomfort attending emphysema. 3. The conditions which may be associated with this complaint must be attended to as they arise, especially asthma; cardiac diseases; venous congestion and its results, including dropsy; and the pulmonary complications which occur in its course, particularly bronchitis. Narcotics must be used with particular caution when the lungs are extensively emphysematous. 4. It is often requisite to improve the general health and the condition of the blood by the aid of tonics, iron, and cod-liver oil, or to treat some constitutional diathesis, especially gout. 5. Whether there is any curative remedy for emphysema is very questionable. Degenerative changes may to some extent be checked by proper dieting. The administration of strychnine, the use of galvanism, breathing compressed air, and other measures have been stated to produce some improvement in cases of emphysema. A change of climate is often exceedingly beneficial. Usually a mild climate, not too dry, suits best; but it is frequently a matter of personal experience as to which is most suitable. It has been recommended to spend the summer in pine-wood regions, where there is a heavy fall of dew.

Interlobular or Interstitial Emphysema.—*Etiology.*—This is a very rare condition, resulting usually from rupture of the air-vesicles as a consequence of excessive pressure upon their interior during forcible expiration, the glottis being at the same time much contracted. Thus it may be induced by violent cough, laughing, or straining during defecation or parturition. Interlobular emphysema is said to be not uncommon in croup, and to occur sometimes as the result of extensive pulmonary collapse. Gangrene of the lung or *post-mortem* decomposition may lead to the presence of air in the interlobular tissue. *Anatomical Characters.*—Accumulations of air are seen under the pleura, varying in size, but generally small, and they may form a border of minute vesicles around the lobules. The air can by pressure be displaced along the course of the boundaries of the alveoli. Superficial collections occasionally give way, opening into the pleura, and thus giving rise to pneumothorax; or into the posterior mediastinum, leading to general subcutaneous emphysema. *Symptoms.*—The only symptom which might lead to the suspicion of interstitial emphysema is the occurrence of severe dyspnœa following one of its causes. It is said that a faint friction-sound is sometimes heard. Should pneumothorax or general subcutaneous emphysema be produced, these conditions would be indicated by their usual signs. *Treatment.*—This consists in taking every precaution to prevent the mischief from extending, and in attending to its consequences.—Frederick T. Roberts.

LUNGS, Gangrene of the.—*Etiology.*—The conditions under which gangrene of the pulmonary tissue may arise are the following: 1. As the result of local disease, viz., acute or chronic pneumonia, phthisis, cancer, hydatids, or bronchial dilatation. 2. From obstruction of one or more of the nutrient vessels by an embolus. 3. In connection with blood-poisoning, as after low fevers, pyæmia, or septicæmia, glanders, or poisoning by venomous animals. 4. In consequence of extreme exhaustion, arising from want of food and bad hygienic conditions, or from disease. 5. In certain nervous diseases, pulmonary gangrene being observed occasionally in cases of chronic dementia, chronic softening of the brain, alcoholism and epilepsy.

Anatomical Characters.—Pulmonary gangrene is either circumscribed, or diffuse. In the circumscribed variety, which is that usually seen, the part involved is distinctly defined, but its extent varies much. The usual size varies from that of a hazelnut to a walnut, but a considerable portion of a lobe may become gangrenous; portion soon becomes moist, softened, pulpy, bluish-green, and extremely fetid; or it may have a greenish-black core, with broken-down lung-tissue around, stinking, irritating, escaping on pressure. The materials may be discharged through a bronchus leaving a ragged sloughy cavity, often with inflamed tissue around. Vessels frequently traverse this space, but as the blood contained in them has coagulated, hæmorrhage does not take place as a rule. Rarely it communicates with the pleural cavity, or even opens into the sub cutaneous cellular tissue, in consequence of adhesions having formed between the contiguous surfaces of the pleura. Subsequently in very exceptional cases a fibrous capsule is developed, the sphacelated portion is expelled, and a cavity secreting healthy pus remains, which may ultimately close up and cicatrize.

The diffuse form of pulmonary gangrene does not present any line of demarcation, but runs into or is mixed up with congested, inflamed, or œdematous lung-tissue. A whole lobe or even the greater part of a lung may be implicated, being more or less softened, sometimes in a state of pulpiness; of greenish or brownish-black or black color; more or less saturated with a dirty grayish-black liquid; and, in short, in the condition of a moist, stinking, putrid slough.

Symptoms.—The only symptoms which are characteristic of gangrene of the lung are an extremely fetid and peculiar smell of the breath, especially after a cough; and the expectoration of gangrenous matters, bearing a similar foul odor, and in which sometimes may be discovered fragments of lung-tissue. The former may precede the latter symptom for some days, and it is sometimes only observed at intervals. It must be remembered however that the breath may be very foul in some cases of chronic bronchitis, and in connection with dilated bronchi or certain cavities. The sputa subsequently become foul and frothy; partly liquid and partly muco-purulent; often dirty, and brownish or brackish in color; while they contain gangrenous particles and occasionally fat crystals, and elastic fibres may be detected in some cases. More or less blood is often present, and death may result from hæmorrhage. On standing the sputa separate into layers, and a thick sediment falls. The general symptoms in most cases are those of extreme depression, adynamia, and collapse, accompanied with low nervous phenomena, ending in speedy death. If the gangrenous materials are swallowed, severe diarrhœa, with tympanitis, is liable to set in. Emboli may be carried from the lung, and originate septicæmic abscesses elsewhere. Ocasionally death takes place slowly, preceded by the signs of hectic fever, or very rarely recovery may ensue.

Physical Signs.—At first these are merely indistinct breathing, with moist rales; followed, if the gangrene is circumscribed, by more or less marked signs of a cavity containing thin fluid. Extensive bronchitis or pleurisy is often set up.

Prognosis is necessarily exceedingly grave in cases of pulmonary gangrene, the termination being generally fatal.

Treatment.—The measures to be adopted are to administer abundant nourishment, as well as large quantities of alcoholic stimulants, with ammonia, and bark, ether, camphor, mineral acids, or quinine; to use frequent inhalations of creasote, carbolic acid, tar-vapor, or turpentine; to encourage expectoration in every possible way; and to make the patient gargle freely with some antiseptic, especially Condy's fluid, and drink a solution of chlorate of potash or yeast. Various antiseptics have been recommended internally, such as carbolic acid or sulpho-carbolates, sulphites, or hypochlorites. Should the disease become chronic, as well as during convalescence in those cases in which recovery ensues, tonics are needed, with cod-liver oil, change of air, nutritious diet, and other measures for improving the general health.—FREDERICK T. ROBERTS.

LUNGS, Injuries of—*See Chest, Injuries of.*

LUNGS, Œdema of—*See Lungs, Congestion of.*

LUPUS.—*Description and Varieties.*—Lupus is a chronic, non-contagious, destructive disease of the skin, characterized by extreme obstinacy and liability to relapse. It is met with in three principal forms, which present several important features in common. These are color, configuration, location, course, absence of pain and pruritus, difficulty of cure, and termination.

The prevailing color of lupous lesions is a somewhat violaceous red, with a shade of copper. It disappears under the finger, revealing, the instant the finger is removed, a yellowish hue, to be replaced a moment later by the color that was present before pressure was applied. Sometimes the lesions have a somewhat translucent appearance, like that which characterizes gelatinous tissues.

In configuration, lupous lesions usually exhibit a circular form, showing a strong tendency to extend centrifugally. Irregularity of configuration, dependent on locality, is seen in some forms of lupus when the lesion is seated on the upper eyelid, the ear, and especially the nose.

The favorite location of lupus is the face, but it may appear on various parts of the general surface, usually, however, in connection with, or subsequent to the development of the disease on the face.

With a rare exception, to be mentioned later, the course of the disease is essentially chronic, and it may continue for from five to twenty years, or even longer.

As a rule, there is neither pain nor pruritus. If the lesion be extensive, a sensation of local heat is sometimes complained of.

The difficulty of cure is proverbial. There is no known external remedy that can be depended on to stop the progress of the affection. The surgical treatment is more promising, and by its means the great majority of cases in which it is commenced early enough, and which are not connected with an unconquerable scrofulous diathesis, may be permanently cured.

Except when the affection terminates in death, there is always a scar left to indicate the site of the previous lesion.

The three principal forms of lupus are lupus erythematosus, lupus vulgaris, and lupus exedens, the first two of which present certain sub-varieties.

LUPUS ERYTHEMATOSUS. SYN.: SCROFULIDE ERYTHEMATEUSE.—*Description.*—Erythematous lupus first appears as a small reddish macule, presenting no characteristic feature. This slowly increases, until it can be readily made out as a very slightly elevated patch of peculiar color; dry, and sometimes a little scaly. The fine scales, consisting of small, partly-detached specks of the stratum corneum, may be found all over the patch, which continues to extend, and in four or five years may reach an inch in diameter. Previous to this, atrophic changes commence in the affected part, which ultimately result in the replacement of what was once normal skin by a white depressed cicatrix. As these alterations proceed, the lesion still extends at its periphery, and we have presented an annular infiltration slightly raised above the normal skin outside it, and above the cicatrizing skin within. These processes may go on from year to year until the patch has involved a large extent of surface, and all this while there may be no ulceration. Meantime, other patches may form and increase in size for an indefinite period. In rare cases the extension of the patch ceases spontaneously, and its seat is occupied by a blanched, depressed scar. There is a second form of erythematous lupus, apparently more common in Germany than here, which is sometimes characterized, according to Hebra and Kaposi, by an acute course, and by the appearance of a large number of primitive macules, scattered over an extended surface, or in some cases confluent. These spots succeed each other with more or less rapidity, involving the trunk and extremities with hundreds of macules in one or two weeks. This form is further liable to certain complications. These are, first, painful subcutaneous nodes of temporary duration; second, painful œdematous swellings of the skin and tissues about the joints; third, severe nocturnal osteocopic pains; fourth, hæmorrhagic bullæ, adenitis of the parotid, submaxillary, and axillary glands; fifth, erysipelas, which may be mild, or, on the contrary, severe and fatal. *Diagnosis*—The principal points on which to rely are the color, the slight scaliness, the chronic course, and the tendency to scarring. The only affections liable to be mistaken for it are chronic erythema, chronic scaly eczema, and syphilis. The absence of infiltration in the first of these should be sufficient to distinguish it from lupus. In eczema the history of the eruption and its especial features, together with the total absence of all tendency to the formation of cicatricial tissue, should make the diagnosis clear. A papulo-squamous syphilide might somewhat resemble an erythematous lupus, but the lesions in the former disease would be far more numerous. They would not have lasted any great length of time, and the history of the case and concomitant symptoms would probably be sufficiently distinct to clear up any doubts. *Prognosis.*—The prognosis of erythematous lupus is good as far as any given lesion is concerned, provided it is not already too extensive; as in the majority of cases it can be controlled. A much more difficult undertaking, however is to prevent the appearance of fresh lesions at other points.

LUPUS VULGARIS, SYN. SCROFULIDE TUBERCULEUSE.—*Description.*—The typical lesion of lupus vulgaris in its early stage is a soft, indolent, elastic tubercle of a yellowish or brownish violet color, and with a somewhat translucent aspect. This tubercle may exist alone, or may form one of a group of eight or ten. A single group may be present, or several others may be present on different parts. The lesion is exceedingly chronic, but gradually enlarges, and after attaining a certain size may persist indefinitely in that condition, and finally undergo resolution and disappear, leaving after it a depressed cicatrix. More commonly, however, superficial ulceration occurs, and the lesion becomes covered with a darkish adherent crust or scab. When this is removed the ulceration is revealed. In a short time it is covered with a fresh crust, and each time that this is removed the ulceration is found to be more extensive than before. The ulceration extends superficially, involving, perhaps, the entire thickness of the skin, but, in this form of lupus, not going beneath it. Occasionally, a good deal of infiltration occurs beneath the group of tubercles, and newly-formed connective tissue makes its appearance, the whole giving rise to an elevated or protuberant mass, to which the name of hypertrophied lupus has been applied. Sometimes, on the other hand, well-defined tubercles do not appear to have time to form, but degenerative action commences early, and we have a group of pustules soon crusting over an ulceration of considerable extent. This process goes on more rapidly in this than in the other form, and the floor of the ulcers is sometimes covered with irregular granulations simulating a warty or papillomatous growth. To this condition the name verrucous lupus is sometimes given. *Diagnosis.*—The only disease with which lupus vulgaris is liable to be confounded is syphilis. In the latter disease the lesions are more apt to be generalized, and their progress is much more rapid. In a few weeks syphilis might entail a loss of tissue that would require months or years of lupous ulceration to effect. The ulcers of syphilis have much more sharply cut margins that those of lupus, and the amount of discharge is usually greater, and it possesses a peculiar disagreeable odor not met with in the latter disease. *Prognosis.*—The prognosis is much the same as that of the erythematous. The tendency to relapse is not so great, perhaps, as in the other form. On the other hand epithelioma sometimes develops on the site of a long-standing lupous ulceration

LUPUS EXEDENS. SYN.: LUPUS VORAX.—*Description.*—This disease commences by the appearance of a soft tubercle, which slowly but gradually increases in size until it has attained the volume of a pea or small hazel-nut. By this time a crust will have appeared on its summit. On its removal the ulcer will be exposed. This gradually increases both as to area and depth, and after a time, five or ten years perhaps, the tubercle will have disappeared, and in its place we find a more or less extensive ulceration, characterized by irregular, overhanging margins of nearly normal or less than normal consistence, with perhaps a softish tubercular development similar in character and appearance to the original tubercle. As the ulceration advances not only the skin but also the tissues beneath it are destroyed, leading to great disfigurement of the affected parts. During the progress of the affection additional and, not rarely, symmetrically developed tubercles may appear and slowly degenerate into ulcers. Before, however, these secondary developments have attained any great size the patient will probably have succumbed—very likely, to phthisis pulmonalis. The course of lupus exedens is often exceedingly chronic. After a time, in some cases, the morbid action appears to change, and an epitheliomatous condition supervenes, evidenced by everted and hardened margins, and more or less pain. As a rule, lupus exedens, pure and simple, is not specially painful. A portion of the ulcer may become epitheliomatous, the remainder preserving its primitive lupoid features. *Diagnosis.*—There are but three of the commoner affections with which lupus exedens could by any chance be confounded. These are, syphilis, lupus vulgaris, and epithelioma. In the first instance the duration of the lesion is sufficiently characteristic. In an early stage of lupus exedens it is hardly possible to point out any pathognomonic sign by which it may be distinguished from an early condition of lupus vulgaris. In a late stage the depth of the ulceration is sufficient. From epithelioma it is to be distinguished by the character of the primitive nodule, of the margin, the course and the frequently multiple lesion, and by the pain. In lupus the nodule is softer than the surrounding normal tissue, in epithelioma it is harder; in lupus the margin is irregular and often undermined and not hardened, in epithelioma it is thickened, everted, and hard. In lupus the progress is slow, in epithelioma more rapid; in lupus there may be several lesions in different stages of development, in epithelioma there is rarely more than a single lesion; lupus is comparatively painless, epithelioma is frequently painful. *Prognosis.*—In the early stages the prognosis is good, provided the lesion is so situated that it can be thoroughly removed. The prognosis, however, becomes less favorable as the lesion increases in size, owing to the difficulty of removing the whole of it, until, finally, a condition may be reached, in which operative interference would not be justifiable, not alone in consequence of the extent of the lesion, but also the presence of a cachectic condition that in many cases would by this time have developed.

Etiology of Lupus.—There can be little question that lupus may very properly be considered as one of the expressions of the scrofulous diathesis, this is the view almost universally held in France and England and Italy, and only disputed by the Vienna school, and a few of its adherents in this country.

Treatment of Lupus.—In entering upon the treatment of this complaint, our first inquiry should be as to the hygienic surroundings of the patient. If these are not entirely satisfactory, they must be improved as far as possible. This point having been settled, we come to what may be called the etiological treatment, *i. e.*, the management of the underlying scrofulous diathesis. This calls for careful attention in proportion as its features are pronounced—the most obstinate and continually relapsing cases of lupus being those in which we find the most marked evidences of constitutional impairment. The drugs which have been chiefly employed in this connection are cod-liver oil and preparations of iodine and iron. Cod-liver oil has been given in very large doses with asserted advantage, but we believe that all the good that is attainable from it will be derived from smaller doses than these—yet larger than are ordinarily employed. Of the metallic preparations the most useful is the iodine of iron, which is best given in the ordinary dose of 10 or 15 minims of the officinal syrup two or three times daily, in the oil or separately. Besides these favorite agents there are others that have been less extensively employed, such as juglans regia, chlorate of potassium, small doses of mercury, etc.

But, whatever plan of internal medication is adopted, energetic local treatment will in most, if not all cases, be requisite, this is owing to the infective nature of the processes involved in the extension of the lesions and which is evidenced by the fact that if a patch of lupus be incompletely destroyed the disease will most certainly return. The plain indication then is to remove the lupous infiltration as soon and as thoroughly as possible.

Treatment of Lupus Erythematosus.—Although there are no medicinal agents capable of exerting a specific influence over the lupous process, yet it does not follow that benefit will not ensue from the judicious use not only of the drugs already mentioned, but also of some others. Phosphorus is certainly capable of influencing the disease, but it is a two-edged sword that must be handled with great circumspection. The iodine of starch, given in doses of from one to two drachms three times a day, has been introduced to notice by Anderson. Besnier states that he has cured two cases by the administration of iodoform, in doses of from 8 to 15 grains daily.

In conjunction with internal treatment, suitable local measures should be employed. The object sought by these is either to produce absorption of the lupus cells, to destroy them *in situ*, or to remove them mechanically. Absorption of the infiltration, when limited, may sometimes be produced by the use of strong alkaline applications, such as the sapo viridis, liq. potassæ, etc. Instead of alkalies, acids may be employed. This method is certainly effective in a certain number of cases. The objections to it are the length of time it requires, and the pain and suffering the patient has to undergo. The second method—that is, the destruction of the lupus cells *in situ*—is more quickly effective, and on the whole accompanied with less inconvenience to the patient. It may be carried out either by thoroughly perforating the lesion with a pointed stick of nitrate of silver (or an irido-platinum needle coated by fusion with the salt), by means of punctate or linear scarifications, for which different instruments have been invented; by the application of powerful caustics, as chloride of zinc, Vienna paste, etc., or by the use of the actual cautery.

The mechanical removal of the infiltration was first attempted by Volkmann with the aid of a small spoon-shaped curette. There is no difficulty in scraping away most of the lupous tissue in this way, but unfortunately it is rarely possible to remove the whole of it, and unless this is done the operation must necessarily prove ineffectual.

Our survey having thus far shown us no method which is wholly unobjectionable, or reliable in all cases, we are brought at once to surgical procedures, and experience leads me to advise the following: If the patch be small and conveniently located, as on the cheek, forehead, etc., it should be immediately excised, together with at least one-sixteenth of an inch of apparently healthy surrounding integument. The edges of the wound may be approximated with a suture, the parts dressed with a lotion or ointment of calendula, and permitted to heal. If the patch have attained an area of one-half to three-quarters of an inch in diameter, and exhibits no evidence of commencing central interstitial atrophy, the dermal curette is brought into play and the diseased surface thoroughly scraped. When as much of the infiltration as possible has been thus removed, and the surface of the traumatic ulcer thoroughly cleaned and dried, a potential caustic or the actual cautery should be applied. The actual cautery (Paquelin's) is, for several reasons better than the potential. The lesion having been properly scraped and dried, the Paquelin is brought as near a white heat as possible, and slowly moved over the surface, being kept in contact with the tissue long enough to produce an eschar about one millimetre or a little more in thickness. A bit of absorbent cotton is then applied, and without further dressing the wound is left to take care of itself, which it will usually do in the most satisfactory manner.

If the lesion has existed for several years, and has attained an area of a square inch or more, the probabilities are that interstitial atrophy will be evident in the central and older portions, while the advancing margin will be in slight relief above the surrounding skin. In these cases the central parts already undergoing resolution do not absolutely require active treatment; but the advancing margin should be vigorously attacked. The central portions may afterward be treated to advantage by multiple scarification, in order to transform the cells into fibres, and thus procure an earlier and less depressed cicatrix than if the involution of the lesion is left to the unaided efforts of nature.

It must not be supposed that this plan of treatment, more than any other, is infallible. The tendency to relapse, or reappearance of the lesion in the cicatrix is more frequent in lupus erythematosus than in any other form of the disease; and the recurrence of the lesion may be looked for any time within a year after the operation. If it does not occur within a twelvemonth the case may be regarded as cured, unless fresh lesions shall have developed elsewhere in consequence of a strong constitutional predisposition in that direction. The whole question of relapse *in situ* resolves itself into the simple matter of thoroughness of operation—which thoroughness, however, must be tempered with suitable respect for the neighboring healthy tissue.

Treatment of Lupus Vulgaris.—The etiological and constitutional treatment of lupus vulgaris will be much the same as that already considered. Among the drugs which have been recommended and used in this connection, arsenic claims the first place, and personal experience leads me to credit the drug with some power, more especially in the ulcerative forms.

Mercury and iodide of potassium appear to have been used with benefit in a few cases of lupus—although there is a faint suspicion that these may have been in reality cases of syphilis bearing a resemblance to the other disease.

As to external treatment—the object of this, as in the case of erythematous lupus, is to remove the lesion as quickly and thoroughly as possible. When the lesion is of moderate size and conveniently situated, the most effective treatment is excision. When, however, this is impracticable, other measures must be adopted. Hebra speaks enthusiastically of an ointment consisting of one part of arsenic, three parts of cinnabar, and twenty-four parts of ointment. This is freshly applied every twenty-four hours for three days. On removing the plaster at the end of the third day, all the tubercles, both large and small, are found reduced to the condition of a brownish-black eschar and covered with a thin pus. The pain ceases quickly and completely, and the œdema disappears in two or three days. There are two serious objections to this arsenical treatment, the efficacy of which, however, is conceded. These are the excruciating pain, and the danger of arsenical poisoning—although Hebra states that poisoning did not occur in any of the cases treated by him.

Besides arsenic, other caustics—the biniodide of mercury, the Vienna paste, chloride of antimony, Llandolfi's paste, etc.—may be employed; but whichever is chosen, it should be used with a bold hand, as success will be proportioned to the activity of the caustic and the thoroughness of the application.

The actual cautery is not without its use in the treatment of lupus vulgaris, but its application is secondary to other measures. If the lesion be a suitable one for excision, subsequently apply the cautery at a white heat if any doubt exists as to the thoroughness of the cutting operation.

When, however, excision is impracticable, the legion should be scraped with the curette, with the view to remove as much of the infiltration as possible, and then cauterized. Relapse, however, will sometimes occur, and render a second or even a third operation necessary.

Treatment of Lupus Exedens.—The treatment of this form of lupus is to be conducted on the same principles as hold in the other varieties. If, for any reason, extirpation with the knife is impossible, scraping, followed by the actual or potential cautery, will give the best temporary result, and also the best guarantee for the future. When, however, the lesion has already attained a large size, and extends deeply beneath the corium, the condition must be regarded as almost hopeless, and the operation should be thorough and radical in the extreme. Both the curette and knife must be brought into play, and every ramification and trace of the disease be removed, so far as it can be mechanically. After the bleeding has ceased and the wound cleansed, the parts should be thoroughly cauterized, and the cavity packed with absorbent cotton. If a few weeks after the healing of the traumatic ulcer, there may be indications of relapse. These must be immediately attacked, and by carefully watching for and destroying these fresh outcroppings, the surgeon will be able, in a certain number of cases, to control the disease. In this, as in all varieties of lupus, one general statement may be made, and this is that half way measures do more harm than good. Attack the lesion in the most vigorous manner, or leave it entirely alone.—HENRY G. PIFFARD.

LYMPHANGIOMA.—Tumors composed of dilated lymphatic vessels, or of lymphatic glands which have undergone cystic degeneration, are occasionally met with. As a rule they do not implicate the corium primarily, and belong to the domain of general surgery rather than to that of disease of the skin.

In a case described by Kaposi, under the name of lymphangioma, tuberosum multiplex, hundreds of small, rounded, brownish, slightly raised nodules were found embedded in the substance of the corium. They were about the size of lentils, became pale on pressure, and were slightly painful. On microscopic examination of an excised tubercle it was found to consist of circular or oval spaces, most numerous in the deeper layers of the corium, lined by endothelium, and identical in structure with dilated lymphatics. No changes were found in the bloodvessels or papillary layer, and, with the exception of pigmentation of the lower rete cells, the epidermis was normal.

The tumors exercised no influence on the general health, gave rise to no subjective symptoms, and extended but slowly; they showed no tendency to involution, and remained unaffected by treatment.—MALCOLM MORRIS.

LYMPHANGITIS AND LYMPHADENITIS.—Inflammation of the lymphatics and their glands. Like other inflammations it may be acute, sub-acute or chronic. Most of the differences between these three forms are such as are analogous to their differences in inflammations of other superficial parts.

Causes.—Almost always, especially in the case of acute and sub-acute forms, absorption of inflammatory or septic material from a wound or pustule, or fissure or sore. According to Paget, the poison or irritant, at all events in the instance of post-mortem virus, may be absorbed through unbroken skin. Chronic glandular inflammation and enlargements are scarcely distinguishable from strumous glands on the one hand, and from lymphoma on the other; they will, therefore, not be further noticed here.

Anatomy.—Chiefly deduced by analogy from observations on uterine lymphangitis. Vicinity of lymphatics and glands is the seat of hyperæmia and plastic infiltration. This often leads in parts to local (rarely diffused) abscesses, including even deposits of pus in the lymphatics themselves. The process usually ceases at the first glands on the upward course of the lymphatics affected. The glands themselves become congested, swollen by serous effusion, and crowded to obstruction with corpuscles. The main terminations of lymphangitis are three: (1) resolution, (2) suppuration, almost always with satisfactory recovery, (3) pyæmia, and then usually death. Not unfrequently cases of dissecting wound with lymphangitis and abscesses in the track of the lymphatics affected, are wrongly spoken of as pyæmia. If such cases were true pyæmia, recovery in them would scarcely be so frequent as it is. The cellular thickening caused by lymphangitis and adenitis is often very persistent, and the small erysipelatous patches may enlarge vastly.

Signs.—Track of inflamed lymphatics marked by red lines, or red band, or by thickening and hardening of the lymphatic cord. Often œdema in the neighborhood, or even of the whole region or limb. · Pain, tenderness, stiffness. In certain places frequently patches of superficial cutaneous redness similar to (possibly identical with) erysipelas. Where suppuration occurs, there is softening, easily detected by drawing the tip of the forefinger lightly over the part. The amount of fever and gastric disturbance varies from *nil* to the highest grade. Usually a sudden rise of temperature, even to 104–5°. In the course of any wound, rigors or such a temperature usually signify local lymphangitis.

Diagnosis.—From phlebitis. Course of veins and of lymphatics not anatomically identical. No glands on the veins. Inflamed veins are "knotty."

Prognosis.—Usually in all respects good; but in the case of large operation wounds, compound fractures, and the like, signs of lymphangitis require very prompt attention; and there are certain forms of blood-poisoning which first manifest themselves by lymphatic inflammation, and which are singularly fatal. The fatality of such cases is usually due more immediately to pyæmia, phlebitis, thrombosis, and embolism; while its remote cause is often either the intense septic malignancy of the absorbed poison, or perhaps local anatomical peculiarity, *e. g.*, proximity to cerebral sinuses.

Treatment.—Rest, general and local; elevation, fomentations, poultices, pressure. Pressure, to succeed, should be very skillfully and gently applied. Equal parts of extractum belladonnæ and glycerine, on cotton wool, may be bandaged upon inflamed glands. Puncture as soon as softening is distinct. Mercurial ointment, iodine paint, pressure, and "massage" (shampooing) for persistent thickenings. Attend to general symptoms. Calomel and salines often valuable. As a rule, prefer low diet.

WOUNDS OF LYMPHATICS almost invariably close by spontaneous coagulation of lymph. Lymphatic discharging sinuses are very rare. *Treatment.*—Pressure.

VARIX OF LYMPHATICS.—Very rare. *Treatment.*—Pressure.—C. B. KEETLEY.

LYMPHOMA.—*See Tumors.*

MACROGLOSSIA—*See Tongue, Diseases of.*

MALARIA.—There are certain affections which have been almost universally recognized as being the result of the action of a malaria[illegible] or telluric poison upon the system. Amongst these the most striking are fevers of an intermittent or remittent type, before considering which i[illegible] therefore requisite to indicate the main facts relating to malaria. Of existence of such a poison there can be no doubt, though this has b[illegible] denied by a few observers, some of whom have attributed the effe[illegible] noticed to general chilling of the body; others to some electrical condit[illegible] of the atmosphere.

1. *Origin and Propagation.*—The malarial poison is ordinarily an emanation from soils more or less rich in organic matter, and which are not devoted to the maintenance of healthy vegetation. The essential conditions for the production of this poison are decomposition of vegetable organic matter, a certain temperature, and a certain degree of moisture. Without the first of these it cannot possibly originate. Very rarely are malarial diseases generated under a temperature of 60° F., and the heat must be of some duration. As this rises they become more prevalent and more severe, and hence they are very virulent in certain tropical climates. There must not be too much moisture, else the poison is absorbed by it; while it is not formed if the atmosphere is dry.

The necessary conditions, as regards vegetable decomposition and moisture, are met with under the following circumstances: 1. In marshes and swamps, unless the soil is peaty or constantly overflowed with water, conditions which materially interfere with the development of malaria. 2. Where there is much vegetable matter in the soils of valleys and ravines, at the bases of mountain ranges in tropical climates, in alluvial deposits, along the banks of tropical rivers, in old estuaries, the deltas of rivers, etc. 3. Where surfaces covered with much vegetation have been temporarily overflowed, so as to be left moist. 4. During the drainage of lakes, ponds, etc. 5. In sandy plains containing organic matter, if there is a subsoil of clay or marl, conditions often existing simultaneously in old river courses. Also in the lower chalk-formations, with a subsoil of clay or marl. 6. In certain hard granitic or trap rocks containing organic matter, such as fungi, especially if they are disintegrating. 7. In turning up the soil in the early cultivation of land, digging canals, making railways, etc. 8. Where copious vegetation has been cleared away, in dense jungles for purposes of cultivation, sufficient being left behind to decompose. It frequently happens that the first result of attempts at cultivation of a new district is the production of malarial diseases, which ultimately disappear. 9. When tracts of land are from any cause allowed to fall out of cultivation, especially if the soil is rich in organic matters. 10. On board ship, where decomposing vegetable matter is mixed with bilge-water, or where malarial mud has in any way been accumulated.

The following conditions influence the development and propagation of malarial affections: 1. *Season.*—Usually these complaints are most prevalent towards the latter part of summer and in the autumn, and many malarial districts may be visited without any danger in the winter which cannot be approached in the warm season. They are particularly liable to occur after long-continued dry and hot weather, followed by warm rains. In climates where the summer is short, even though very hot, they are not prevalent. 2. *Water.*—Abundance of water constitutes a protection against malarial affections, because it absorbs the poison. Hence they are temporarily diminished by long and heavy rains and floods. Any deep sheet of water, especially running water, affords some degree of protection, and thus the intervention of a river may prevent the poison from passing from one of its banks to the opposite one. A ship at a little distance from shore is in comparative safety. Some believe that sea-water is peculiarly protective, though it is said that the occasional admixture of salt water increases the emanations from marshes. 3. *Winds.*—These frequently convey the malaria for a considerable distance along plains, and may thus be the means of originating malarial affections in places remote from a malarial district, also counteracting the good effects of the intervention of water, etc. On the other hand, a storm may drive away the poison altogether. 4. Low districts are more dangerous than those which are elevated, the malaria tending to cling to the earth. By the aid of ravines and hot air, however, it may be carried up mountains to a great height, it is stated even as much as 2000 or 3000 feet. The lower rooms of houses are more dangerous than the upper. 5. *Trees.*—When in large numbers these afford decided protection, both by interfering with the propagation of the poison, and by keeping off the sun's rays from the soil; in some cases, however, they seem to be injurious. Certain trees are said to exert a specially protective influence, particularly the Eucalyptus globulus, but this is more than doubtful. 6. Mountains and hills interfere considerably with the dissemination of malaria. 7. *Time of the Day.*—Morning and evening dews augment the danger from malaria materially, probably from condensing the poison. It is highly dangerous to sleep in tents at night in malarial districts. 8. The air of cities in some way renders the poison innocuous, for though a malarial disease may be raging in the surrounding districts, it does not penetrate far into their interior. 9. Artificial heat destroys malaria if sufficiently intense. 10. Individual susceptibility is increased by certain circumstances, namely, recent arrival in a malarial district; fatigue and exhaustion from any cause; exposure to the full heat of the sun; sudden changes in temperature, and chills of all kinds; intemperance; exposure on an empty stomach; overfeeding; mental exhaustion or nervous depression; and overcrowding. Some persons are far more susceptible than others. Young children and old persons are least subject to malarial affections, and males are said to be more predisposed than females. White races suffer more than blacks. It is said that the use of drinking-water from a malarial district may produce malarial diseases.

2. *Nature.*—Much doubt exists as to the nature of the malarial poison. It has been supposed to be a gas resulting from vegetable decomposition, but the favorite view is that it is organic, consisting either of microscopic plants or their spores, or of animalcules. At present, however, neither chemical nor microscopic investigation has succeeded in demonstrating the nature of malaria. It has been suggested that there are different kinds of paludal poisons, but of this there is no proof. When animal matters are mixed with the decomposing vegetable material, the poison which escapes seems to be more virulent.

3. *Mode of Entrance into the System and the Effects Produced.*—The poison is chiefly inhaled, and then absorbed by the pulmonary membrane; it may also be taken up by the stomach, which it often seriously disorders, and possibly by the skin. Malaria acts on the nervous system, and gives rise to fevers of an intermittent or remittent type, followed after a time by permanent organic changes, especially in the liver and spleen, while it also originates neuralgic affections. Certain other disorders are attributed to its influence, such as diarrhœa, gastric derangements, palpitation of the heart, pains in the limbs and joints, and amenorrhœa, as well as a general state of ill-health, and a peculiar malarial cachexia, with ultimate degeneration of the race. A large number of males in some malarial districts are said to be impotent. Dysentery and hepatic abscess are very prevalent in certain tropical malarial regions. Malaria imparts a peculiar periodicity to the affections which it originates, and once they have been developed they are liable to recur on subsequent occasions independently of the action of the original exciting cause, sometimes, indeed, apparently arising spontaneously. Various complaints tend to assume a periodic character in malarial districts.

4. *Prophylaxis.*—The precautions to be taken by those who are obliged to reside in malarial districts may be gathered from what has been already stated. Everything must be avoided which increases the individual tendency to malarial diseases; and every means of protection employed, so far as this is possible, in arranging a place of residence and other matters. It is a useful practice to give cinchona bark or quinine daily to those who are unavoidably exposed to malaria. Garlic and the eucalyptus

globulus have also been used as preventives. Lately it has been proposed to plant the eucalyptus extensively in malarial regions as a preventive measure.

II. INTERMITTENT FEVER—AGUE.—*Etiology.*—Ague is the malarial fever which prevails in this country, occurring mainly in low marshy districts. Cases are also met with here in which the complaint has originated in foreign climates. Once the disease has been excited, subsequent attacks may arise without any exposure to malarial influence. *Anatomical Characters.*—The spleen presents the most notable changes, being at an early period much enlarged from congestion, softened, and sometimes pulpy. After a while it becomes permanently hypertrophied and firm, constituting the so-called ague cake. The liver is also congested and soft, and ultimately hypertrophied; it has been stated that albuminoid disease of this organ is occasionally produced in cases of prolonged ague. The stomach and duodenum are often congested, their mucous membrane being also softened; in some cases ulcers have been observed. In rapidly fatal cases the heart is softened, and its tissue undergoes degeneration. Chronic Bright's disease is believed to be set up sometimes by ague. In persons who have resided for a long period in malarial districts, black pigment is often found in the spleen, liver, and kidneys. The blood is unhealthy, and may also contain black pigment. *Symptoms.*—Ague is characterized clinically by paroxysms of fever, running through certain definite stages, and occurring at more or less regular intervals, with intermediate periods of complete apyrexia. 1. The invasion is generally indicated by the ordinary symptoms premonitory of fever, which are noticed for some days before the disease declares itself, the pyrexia presenting well-marked remissions, with a periodic tendency. Sometimes the attack is sudden. 2. A paroxysm or fit of ague consists of three successive stages, named respectively the cold, the hot, and the sweating stage. *a. Cold Stage.*—Ordinarily a fit of ague is preceded by general uneasiness and languor, inaptitude for any exertion, headache, and loss of appetite. Soon the patient feels cold, first in the limbs, then along the back and over the body. The teeth begin to chatter, and finally the entire frame shivers. At the same time the general surface of the skin appears pale and shrunken, especially that of the face, the features being pinched and sharp. The tips of the fingers and the lips are blue, while in severe cases the whole surface assumes a purplish hue. Cutis anserina is frequently observed. The patient often complains of pains in the back and limbs, as well as of headache. The tongue is usually pale, moist, clean, and cool; appetite is lost, but thirst is a frequent symptom. Nausea and vomiting are not uncommon, with uneasiness and a sense of weight in the epigastrium. There is a feeling of dyspnœa, with hurried breathing, and often a dry cough, the expired air being cool. The pulse is usually frequent and small, and may be irregular. The intensity of this stage varies greatly. There may be signs of serious depression or collapse, with a tendency to stupor or coma. Its duration ranges from a few minutes to three, four or five hours. *b. Hot Stage.*—The transition to this stage may be sudden, but is generally gradual, being indicated by alternate flushings and chilliness, or by parts of the body becoming warm. When it becomes fully developed the skin feels burningly hot and dry, is red and tumid, and sometimes a patchy rash appears. The face is flushed, and the eyes are injected and sparkling. There is intense thirst, with dryness and heat of mouth, total anorexia, a white tongue, and sometimes nausea or vomiting. The heart and great arteries throb, and the pulse is generally strong and full. Respiration is more quiet than in the first stage. Headache is always present, with a sense of throbbing, and sometimes more or less delirium occurs, which may be very violent, or convulsions may set in. This stage lasts usually from three to eight hours, the extremes being from two to eighteen hours. *c. Sweating Stage.*—Perspiration breaks out first about the forehead, and then by degrees extends over the body. Its amount varies, but it is generally considerable, so that the bedclothes become saturated, and sometimes even the bedding. In cases originating in certain malarial districts the perspiration is said to have a peculiar sickly and most disagreeable odor. It continues to flow for some time, during which the pyrexia becomes reduced, and the symptoms rapidly abate; the patient usually soon falls asleep, and awakes feeling well or comparatively well. Along with the sweating there is a critical urinary discharge, and not unfrequently diarrhœa. Anasarca has been observed when sweating is deficient. 3. *Intermission*—At first a person suffering from ague may feel quite convalescent during the periods intervening between the paroxysms, but soon more or less languor and depression is experienced, with neuralgic pains, and loss of appetite, while the patient becomes pale and anæmic. After a while permanent organic mischief is established, especially in connection with the spleen, attended with more serious symptoms, which are described in the chapter on Diseases of the Spleen. *Temperature.*—The course of temperature in ague is quite characteristic, the paroxysms being marked by a rapid ascent, short and intense stationary period, and critical defervescence, the temperature in the intervals being perfectly normal. A rise is observed as soon as, or even before, the cold stage begins; at first it is only slight and gradual, but soon becomes rapid, continuing during the hot stage, and sometimes into the commencement of the sweating stage. The temperature generally runs up to 105° or 107°, but may reach 108°, 110°, or even 112° in hot climates. When sweating begins there is generally a slight alternate rise and fall at first, but soon a steady fall sets in of 2° or more every five to fifteen minutes, until the temperature becomes normal. It is important to notice that even before the paroxysms are experienced, and after they have apparently ceased, the temperature has been observed to rise at the usual periods. *Urine.*—During the cold and hot stages water is increased, but it diminishes at the close of the latter stage, and is very deficient while sweating is going on, so that the urine becomes concentrated, and its specific gravity rises. Urea suddenly increases in amount as soon as the rise in temperature begins, and this continues until the sweating stage sets in, when it rapidly or gradually diminishes, often falling below the normal. A relation is said to exist between the amount of urea discharged and the temperature. Uric acid is also considerably in excess, and urates are generally deposited at the close of a fit of ague. Chloride of sodium is greatly increased, while phosphates are much diminished or even disappear after the height of the paroxysm. Albumen, blood, or casts are not unfrequently present in the urine. In the intervals the state of the urine varies much. It is not uncommonly alkaline in reaction. Urea is deficient as a rule during the intermissions. *Types and Varieties.*—The chief types of intermittent fever are those founded upon the length of the interval between the paroxysms, viz.: 1. Quotidian, in which there is a daily paroxysm, with an interval of twenty-four hours. 2. Tertian, where a fit occurs every other day, the interval being forty-eight hours. 3. Quartan, a paroxysm taking place every third day, the interval being seventy-two hours. These are the usual types, but exceptionally the following are met with: 4. Double quotidian. 5. Double tertian, a seizure occurring every day, but at at different hours, or presenting different characters. 6. Double quartan, out of three days two having each a paroxysm, the third none. 7. Duplicated tertian, there being two paroxyms one day, none the next. 8. Erratic or irregular. Other rare types are described.

The quotidian, which is the most common, has the longest paroxysm; this is said to occur earlier in the day, and to have the shortest cold stage, but the longest hot stage. In the quartan variety, which is the least common, the conditions are just the opposite, the tertian being intermediate. Sometimes the fits tend to begin earlier or later each time, and thus ultimately one type may be converted into another, or the change may take place suddenly. A paroxysm may present certain peculiarities. Occasionally one or more of the stages may be wanting. The phenomena are in rare instances limited to certain parts of the body; thus in paralyzed patients they may be confined to the non-paralyzed parts. Certain forms of ague are also described which depend upon the character of the symptoms present, viz.: 1. Sthenic. 2. Asthenic. 3. Pernicious or malignant, the last approaching the remittent type, and only occurring in hot climates, being attended with delirium, coma, or an algide or collapsed condition. *Complications and Sequelæ.*—Persons suffering under the influence of malaria are very liable to pneumonia, which comes on rapidly, often involves both lungs, and is of a very dangerous character. This is particularly observed in patients returning from hot malarial climates to cold climates. The blood is also prone to undergo acute changes of a serious character, ending in marked anæmia, with excessive formation of white corpuscles, this condition being accompanied with dropsy. Various forms of neuralgia are apt to follow ague. *Prognosis.*—Intermittent fever is not often directly fatal in this country, and can usually be cured. Some of its varieties are exceedingly grave, and especially those cases classed as pernicious. The complications just mentioned are also very serious. If treatment has been long delayed, so that the malarial cachexia has become established, it is difficult to bring about a complete cure. The quartan type of ague is the most obstinate form to be got rid of. It must be remembered that those who have suffered from this disease are liable to future attacks, apart from any exposure to malarial influence. *Treatment.*—1. During the paroxysm.—In the cold stage the patient should remain in bed, being well covered with blankets, some form of dry heat being applied externally, and hot drinks administered. In this country nothing further is necessary as a rule. When there is much depression, diffusible stimulants are required, and a little opium may be given to relieve great restlessness. Persistent vomiting is best checked by giving an emetic of sulphate of zinc, with plenty of warm water. If this stage is greatly prolonged a hot-air bath may be employed. In the hot stage the skin should be sponged freely, and cooling effervescent or saline drinks be given. During the sweating stage nothing is necessary but to keep the patient covered, so as to prevent a chill. 2. During the intervals.—The great remedy at this time is quinine, and it rarely fails to bring about a speedy cure. There is much difference of opinion as to the mode in which it should be administered. By some it is recommended to give one large dose—gr. xx–xxx, either before or at the close of the paroxysm. In a large number of cases which came under my treatment at the Liverpool Northern Hospital, I obtained most satisfactory results from the administration of gr. iij-iv, every four or six hours during the intermission, and therefore am disposed to adhere to this practice. In some cases it is said that the stomach rejects quinine, and then it may be combined with a little opium, or be administered by enema. The subcutaneous injection of the neutral sulphate of quinine has also been advocated. It is important to notice that the remedy must be continued for some time after the paroxysms have apparently ceased, that is, until the temperature has become quite normal. Various substances have been employed as substitutes for quinine. Of these the most reliable are cinchona bark, *cinchonin, quinidin, cinchonidin,* salicin, and arsenic. The last is decidedly beneficial, and has the advantage of being cheap. It is best given in the form of Fowler's solution, beginning with four or five minims three times a day. The alkaline sulphites have also been recommended. Dr. Mossman, of Greenville, U. S., informs me that full doses of chloral, given just before the expected paroxysm of intermittent fever, will prevent its occurrence. 3. Symptoms and complications may arise in the course of ague, requiring special attention. They must on no account be permitted to interfere with the use of quinine. Possibly venesection may be indicated, but I have never met with a case of ague necessitating it in this country. Adynamic symptoms must be treated by external and internal stimulation. For the cachexia induced by ague, as well as for the different neuralgic affections, quinine, iron, and arsenic constitute the most reliable remedies, and they may be advantageously combined. Phosphorus may also be found serviceable. The tincture of eucalyptus globulus has been highly extolled. Patients should immediately be sent from a malarial region to some suitable climate, care being taken to attend to all hygienic conditions, to give good food, and to see that the clothing is warm, especially if they have to undergo a change from a hot to a cold climate. Various mineral waters and baths may be useful, such as Carlsbad and Friedrichschall waters, and warm baths or Turkish baths. 4. The preventive treatment of ague is that indicated for malarial diseases in general, and if possible, residence in a malarial district should be immediately discontinued.

III. Remittent Fever.—*Etiology.*—The malarial fevers of hot climates often assume a remittent type, presenting irregular exacerbations and remissions, the latter being less distinct if the fever is very intense. They vary much in their severity, and have received many local names. There is no distinct limit between this class of fevers and those of an intermittent type, both being due to the same cause, but this is aided by a high temperature in originating remittent fever. One type sometimes changes into the other. *Symptoms.*—There are generally premonitory signs, but the attack may be sudden. Gastric irritation is usually first noticed, there being a sense of uneasiness or oppression at the epigastrium, nausea, and anorexia, with headache, general pains, and a feeling of languor. Some chilliness or rigors may be experienced, but there is no cold stage of any duration, and the temperature rises immediately. The hot stage becomes very intense, the skin being burning and dry, the face flushed, the eyes injected, with intense headache, giddiness, restlessness, sleeplessness, and often delirium, which is sometimes violent. Vomiting and nausea are commonly present, the vomited matters consisting first of food, then of a watery fluid, and finally of biliary matters; they may become brown or black. A sense of great oppression and weight is felt in the epigastrium; the tongue is furred and tends to dryness, the lips are parched, and there is intense thirst. The pulse is frequent, and either full or small and compressible. The symptoms abate generally in from six to twelve hours, but may continue for twenty-four, thirty-six, or forty-eight hours, or even longer. Some perspiration usually breaks out as improvement takes place. The remission is of variable duration, and this is followed by an exacerbation, which is of greater intensity than the first paroxysm. The time at which remissions take place, as well as their number, differ in different cases. When the disease is established, there almost invariably a morning remission. The exacerbation may begin noon, declining towards midnight, or it may begin at midnight and last till morning. In severe cases there may be a double exacerbation, namely at noon and midnight. As the case progresses, signs of intense adynamia may set in. Yellowness of the skin is common, and hæmorrhages sometimes occur. These symptoms, associated with black vomit, often causremittent fever to resemble specific yellow fever. Occasionally marked jaundice is observed. The spleen and liver are usually enlarged and tender. The urine is generally stated to be scanty, dark, and of high specific gravity. In India Mr. Maclean has noticed just the opposite characters. It is always acid and rarely albuminous. Urea is increased, and uric acid diminished, until convalescence is established. The entire duration of the disease ranges from five to fourteen days usually. The terminations are in death, from blood-poisoning or exhaustion; in recovery, usually ushered in by free perspiration, but sometimes taking place gradually; or by transmission into an intermittent fever. *Treatment.*—It is important to attend to hygienic conditions and especially to have good ventilation. During the hot paroxysm cool drinks should be given freely, and, if necessary, cold may be applied to the head. External application of cold, by one of the methods recommended for hyperpyrexia, is most valuable. Vomiting must be checked by the usual remedies. As soon as the remission occurs, quinine must be given in 10, 15, or 20 grain doses every two hours; if the stomach rejects this remedy, it must be administered by enemata. Quinine is to be given until the system has become saturated with it, and signs of cinchonism are evident. This drug is also to be used should any complications arise. Warburg's tincture has gained much repute in the treatment of remittent fevers. All antiphlogistic remedies are to be deprecated, as well as the use of calomel, except as an aperient. It is desirable to keep the bowels well opened. Bland nourishing diet is necessary, and stimulants are often required in considerable quantities.—FREDERICK T. ROBERTS.

MALIGNANT PUSTULE.—*Definition.*—A disease produced by the poison of animals suffering from charbon, characterized by the formation of a pustule, by subsequent gangrene, and by severe constitutional disturbance.

Symptoms.—It first appears as a dark-red patch, on which an elevation soon grows; a small pustule forms on this and bursts. The inflamed area rapidly extends, becoming hard, and sloughs. Symptoms of severe constitutional disturbance accompany the local affection, and death frequently takes place in four or five days from the beginning of the disease. It is produced in man by direct contact with the diseased animal, but there is also some evidence that it can be conveyed by flies.

Diagnosis.—There is no disease for which malignant pustule can be mistaken.

Prognosis.—Usually fatal.

Treatment.—In an early stage destruction of the affected part by caustics, or its entire removal by the knife, is advisable. If this be impossible, warm poultices should be applied, and attention should be directed to sustaining the patient's powers.—MALCOLM MORRIS.

MAMMA—*See Breast, Diseases of.*

MAMMILLA—Male, Diseases of.—The affections of the male organ relate to its conditions in a perfectly rudimentary state, and when there is a gland developed; for we have seen and dissected as perfect a passive glandular structure taken from a man as was ever formed in a young girl. Soon after birth the organ becomes tumid, and a secretion forms within the ducts. If left to nature, no difficulty arises. Should inflammation happen, which usually arises from the officiousness of nurses, it must be treated as before described.

At puberty the gland usually enlarges, becomes painful for a few days, and then slowly decreases until nothing but the nipple is perceptible. But if the part be irritated, inflammation running on to the formation of abscess will be excited. In rather delicate men the gland is sometimes largely developed,—hypertrophy. This may occur on one side only, or on both sides. The circumstance generally excites annoyance, but no ill result; although the curious may see in pathological museums breasts of this kind which have been removed and labeled "scirrhus." When these breasts are painful, the improvement of the general health is indicated, and all local pressure must be avoided.

The male is subject to deformities arising from excess of mammillæ: thus we have seen a man with four nipples. We have met with a man who had one only, on the right side. The defect was associated with absence of the lowermost fibres of the left pectoral muscle.

The diseases of this organ in the male are of the same kind as those in the female, already described. But disease very rarely attacks this part in a man. We have seen a sebaceous cyst developed close to the nipple, and elevating it, and so closely resembling the bluish-red tint of a tuber of cancer just.about to ulcerate as to excite grave apprehension; but it was excised with the happiest result. Not long since, Mr. Prescott Hewett * removed a cyst and intra-cystic growth from a man's breast.

Carcinoma is the new growth most commonly developed in the male breast. It occurs generally between forty and fifty years of age, either in the infiltrating or tuberous form, generally, however, in the former, extending slowly, and affecting the integuments in its progress. Its treatment is similar so that adopted in the case of a like disease in the female.—JOHN BIRKETT.

MANIA.—*Natural History.*—Mania, having its origin in disordered emotions, is essentially a disorder of the impulses or propensities in the first instance, tending to more or less "disorder of the intellect (usually of all the faculties) with excitement." One or more of the passions is almost always exalted. There are two forms of the disease—namely, acute mania and chronic mania; and furious expressions of passion, of prolonged duration, are very generally present in the acute form of this disease. It has, in almost all instances, its stages of incubation. At first there may be only apparently trifling irregularities in the affections. The maniac may be at the outset either sad or gay, active or indolent, indifferent or eager, but he soon becomes impatient and irritable, neglects his family, forsakes his business and household affairs, deserts his home, and yields himself to acts which strikingly contrast with his ordinary mode of life. Delirium and reason begin to alternate with each other. Periods of composure and agitation succeed each other, and so do acts the most strange and extravagant. The kindest love and tenderness of domestic life serve but to irritate and provoke, so that to remain amongst his family excites the patient by small degrees to the highest pitch of fury. It is seldom in mania as in monomania, that the patient is insane on one subject only. His mind is a perfect chaos; all is violence, effort, pertubation, and disorder.

In another class of cases the premonitory symptoms are characterized by gloom and despondency, upon which the maniacal excitement supervenes. There is generally a marked departure from the patient's former state of health. Insomnia is one of the most important and earliest symptoms. The functions of the body are more or less deranged, and fever, sometimes severe, may prevail.

Special or partial forms of mania are—

(*a.*) Homicidal mania, in some cases the result apparently of delusions, of suspicion, or of implacable enmities against supposed foes. A plausible reason is generally assigned for the attempt to destroy life; the victim is represented as having systematically annoyed, or irritated, or conspired against the lunatic. In other cases the attacks are the offspring of momentary, uncontrollable impulse, without cause *quoad* the persons assaulted. The pretext for assault is then frivolous in the extreme. Such homicidal impulse and attempts of the most persistent and dangerous kind may co-exist with a perfect knowledge of right and wrong, and their bearings on human actions—with perfect ability also to manage business affairs, though of a complex pecuniary character—with perfect propriety in maintaining most of the relationships, or of discharging most of the social or public duties of life—with deportment often the most polished and gentlemanly, the most considerate and kind. (*b.*) In suicidal mania there is an irresistible propensity on the part of the patients to destroy themselves, a propensity often developed in connection with religious melancholia—a form most difficult to eradicate or conquer; and, from its inveteracy, the forerunner of incurable forms of disordered intellect. (*c.*) Pyromania, as when the derangements of the emotions and of reason may take the form of arson. (*d.*) Kleptomania is an irresistible desire to steal. (*e.*) Monomania is a term which comprehends various phases of intellectual disorder, attended with delusions; and it is directed by the College of Physicians that cases of so-called monomania are to be classed under chronic mania, or melancholia, according to their character. There is generally an undue intensity and exaltation of the conceptive and perceptive faculties. This disorder of intellect is more or less partial, that some one passion or idea so entirely possesses the patient as often to lead to dangerous conduct. The modes by which the monomaniac gives expression to his particular delusion are endless; and the mental affliction is especially indicated by delusions. The "symptoms of delusion are still accepted in our courts of justice as the most authentic mark of insanity, and as the essence of cerebro-mental disease."

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* Lancet, vol. 1, 1864.

Hallucinations or delusions sometimes occur when the organ is itself destroyed through which they would be objectively expressed, thus showing their subjective nature—*e.g.*, blind people see visions, and the deaf hear sounds, the hallucination being a false conception which the patient could not distinguish from a true perception. The images thus excited are described as vividly as those produced by objective causes; so that the patient, when insane, entirely believes the empty and false forms he sees, the ideal sounds he hears, to be real and substantial. Nothing can persuade him of the non-reality of any one of them. In cases of disordered intellect, if a part of the body be diseased, the imagination often personifies the local lesion into some strange reality.—WILLIAM AITKEN.

MANIA, Puerperal—*See Puerperal Mania.*

MASTODYNIA—*See Neuralgia.*

MASTOID DISEASES are developed usually, as a consequence of purulent inflammations of the tympanum. Periostitis of its outer surface is the result of extension of the inflammation from the tympanum outward along the periosteum of the meatus. A frequent result of this form of inflammation is a mastoid abscess, which is likely to point at some spot nearly behind the meatus, or a little above or below. A similar form of inflammation may occasion abscesses above or even in front of the meatus. In the acute form of the disease there is considerable pain; the region of the mastoid becomes swollen, pits on pressure, and is generally, but not always, reddened. Striking the part with the end of the finger elicits pain. The whole side of the head may be tender to the touch and painful. Usually when pus makes its appearance it may be detected, but sometimes the tissues are so swollen and boggy it will give many of the signs of fluctuation when no pus is present. In an adult healthy subject, the bony wall of the mastoid cells may escape disease, but in those who resist inflammation badly the bone may become necrotic, and even carious. In children it is of very frequent occurrence. This form of mastoid disease is not as dangerous as mastoid cell disease.

The treatment is usually to make an incision quite to the dividing of the periosteum, as recommended by Wilde. Do not go too near the auricle on account of larger arteries. A little more than half an inch is a good rule. If there is great swelling in front do not cut directly down upon the part, for fear of large bloodvessels, but pucture below or above the swelling, then pass in a probe or grooved director and endeavor to reach the abscess cavity. Keep open the wound by a tent, or daily open it afresh with a probe ; I prefer the latter method. Wash out with a solution of carbolic acid, and if there is an opening into the mastoid cells, syringe out the aperture so as to throw the water into the tympanum, making its exit from the meatus. In the incision, the point of the knife may often be distinctly observed to pass to a deeper level than the periosteum, and to come in contact with rough and dead bone. Granulations frequently cluster about the incision, requiring removal or cauterization. After the incision a poultice may be used for a few days, but do not macerate the parts unnecessarily. Leeches may sometimes arrest the inflammation, and save the pain of the incision. I am not as much in favor of cutting as formerly.

In the chronic form of mastoid periostitis, there is very little or no pain. Swelling may or may not be present; cases are recorded where the bone beneath has become carious without any signs of trouble in the integument over the mastoid. In strumous subjects and children this condition is more likely to be found. The destruction of bone may go on so as to cause nearly or quite the whole of the bony wall of the organ of hearing to be separated as a sequestrum. A case of my own, published in the "Transactions of the American Otological Society for 1872," illustrate this point. Many other similar cases have been reported. The incision is always necessary in these cases, provided it has not already opened; then the general cleaning processes before recommended are in order. Often granulations spring from the cavity of the mastoid cells, which may be treated by evulsion and cauterization. No pus should be allowed to be retained, even if it be necessary to use gouges, drills, or trephines to liberate it. A few cases are reported where the mastoid has become affected independent of any tympanal affection. In the Transactions of the International Otological Society for 1876, I reported a case of abscess over the mastoid, but without any ear complication whatever; the temporal bone was perforated, and there resulted an abscess beneath the dura mater, which ruptured and involved the brain substance. This is exceedingly rare. Sometimes a sinus may lead from the outer surface of the mastoid to deeper parts, in which may be confined a sequestrum; in that case enlarge the sinus by drill, gouge or trephine, and remove it.

Mastoid cell disease may commence as a simple and harmless catarrh of its mucous lining, which has extended from the tympanum and may cause no noticeable or important results. Again there may be the same changes as those found in inflammation of the tympanum in what is called dry catarrh. There may also be an inflammatory proliferation, which fills the mastoid cells, and extend so as to even increase the size of the mastoid bone. At first this may be semi-solid, but ultimately a true osseous development results. Again the inflammation of the mastoid cells may be of so violent a character, as to involve the bone destructively, causing extensive caries, with exfoliation of considerable masses; may involve the brain, producing abscesses, with plugging of the sinuses in the neighborhood and often obliterating them. Pyæmia and septicæmia also result, and death very frequently is a consequence of these processes. There may or there may not be considerable pain. The patient sometimes will be in bed with a fever and accompanied by head symptoms. At other times he may be up and about, with few symptoms, although destructive processes may be going on. There may or there may not be symptoms of mastoid disease externally. This train of symptoms may more frequently result during a relapse of acute inflammation, after the patient has partially recovered from the first attack.

Treatment of mastoid cell inflammation.—If an incision has been done and discharge takes place freely, and especially if there is a ready communication between the wound in the mastoid and the tympanum, and there is no longer pain or head symptoms, nothing more in an operative way may be needed. Keep the parts clean by syringing, at least once a day, with either warm salt and water or carbolic acid solution. Granulations may be disposed of as before suggested. If at any time the discharge should suddenly diminish or cease, with febrile or head symptoms, antiphlogistic measures may become necessary. The wound needs to be investigated, and if there is any evidence of retained discharge, go down upon the parts with a gouge or trephine and remove any dead bone which may stand in the way of a free discharge, for the tendency of the disease is towards the inner rather than the outer boundary of the mastoid. The dental drill, propelled by the dentist's engine, is a very elegant mode of removing dead bone from the mastoid region, and will do it with only a small amount of pain. Pot. iodid. in large doses or the pot. bromid., or they may be given together, are indicated for any head symptoms. If these are ineffective, ergot may be administered. Counter-irritation at the nape of the neck may be used. An iced bag may sometimes be applied to the head, but if it causes pain, use hot water instead. It is well not to be too anxious to remove dead bone, for it separates spontaneously, as a rule, without trouble. If there is pain in the side of the head and about the ear, that resists ordinary treatment, it will be justifiable to cut down on the mastoid, and whether a fistulous opening be found or not, open freely into the cells by the drill or trephine, and endeavor to find whether retained secretion be present. Some cases are very puzzling. In all the treatment, the general tone of the system needs to be looked after, by proper nourishment and possibly stimulation. Dr. Buck, of New York, has devised a most excellent drill and gouge for operations on the mastoid. A stout scapel is often all that is necessary to cut through softened bone, to reach the mastoid cells and liberate any confined matter.—OREN D. POMEROY.

MEASLES.—*Definition.*—Measles is an acute infectious disease characterized by the production of an eruption of red papules, accompanied by symptoms of coryza and general constitutional disturbance.

Symptoms.—From ten to fourteen days after the reception of the poison the patient becomes ill and feverish, shivers, sometimes vomits, and complains of headache. The skin becomes dry and hot, the tongue coated with white fur, through which a few large papillæ may show themselves; the eyes become suffused, the eyelids swollen, the fauces injected, and sneezing, pain in the frontal sinuses, and all the symptoms of a severe catarrh appear. The temperature rapidly increases, the pulse is quickened, and the rash appears on the fourth day, first on the forehead and face, and thence extends over the rest of the body and extremities, about one or perhaps two days being occupied in its complete development.

As the rash makes its appearance the face becomes more swollen, the coryza increases, and an exacerbation of the constitutional symptoms, together with some amount of bronchitis, nearly always appears. After the rash has existed for two or three days it gradually fades, and the constitutional symptoms subside.

The rash first presents itself as a number of small red spots irregularly scattered over the skin, which rapidly become raised, forming dark-red colored papules from $\frac{1}{20}$ to $\frac{1}{4}$ of an inch in diameter.

On the face especially, and on all parts of the body where the papules are closely aggregated together, they coalesce and form patches of various sizes and of a crescentic shape; as the rash fades a temporary staining of the skin remains, which disappears after some days. The rash fades on pressure, but at once reappears on the removal of the finger, and its disappearance is often followed by desquamation of the skin in small scales.

Several varieties of the rash are described.

1. Morbilli Læves.—In this variety healthy skin intervenes between the maculæ, which are but slightly raised.

2. Morbilli Papulosi.—The papules are more raised and of a dark-red color; they are situated at the mouth of hair follicles, and closely resemble the papules of small-pox.

3. Morbilli Vesiculosi.—The mouths of the hair follicles are filled with fluid, and small vesicles are thus produced.

4. Morbilli Confluentes.—Occur when the maculæ are crowded so closely together that they coalesce and no healthy skin intervenes between them.

5. Morbilli Hæmorrhagici.—This form of rash results from hæmorrhage into the maculæ, which of course do not then fade on pressure.

Diagnosis.—There are four diseases for which measles may at first sight be mistaken,—scarlatina, rotheln, roseola, and variola.

The following table will show the difference between these diseases in the early stages; at a later stage the difference in the appearance of the rashes become more marked, the different constitutional symptoms more fully developed, and the diagnosis consequently easier :

MORBILLI.	SCARLATINA.	ROTHELN.
Rash appears on the fourth day.	Rash appears on the second day.	Rash appears on the first day.
Slight sore throat.	Considerable sore throat and injection of fauces.	Slight sore throat.
Tongue furred, few papillæ enlarged.	Tongue furred, many papillæ enlarged.	Tongue furred; papillæ slightly enlarged, chiefly at edges.
Severe catarrhal symptoms.	No catarrh.	Slight catarrh.

ROSEOLA.	VARIOLA.
Rash appears on the first day.	Rash appears on the third day.
Slight sore throat. Tongue very slightly furred, only few papillæ enlarged at edges.	Slight sore throat. Tongue furred, papillæ not enlarged
No catarrh.	Suffusion of eyes only.
	Severe lumbar pain.

Prognosis.—Usually favorable, but at times dangerous, owing to the long complication.

Treatment.—This consists in putting the patient on a proper regimen and paying careful attention to the bowels, etc. The lung complication may require the administration of an emetic and the application of warm poultices to the chest. Local treatment of the rash is not required, but sponging the body with aromatic vinegar and water is useful in allaying irritation.—MALCOLM MORRIS.

MEASLES, German—*See Rotheln.*

MEDIASTINAL TUMORS.—Aortic aneurism is the most frequent form of mediastinal enlargement. The other chief varieties met with include cancer (either encephaloid or scirrho-encephaloid), originating in the œsophagus, lymphatic glands, root of the lung, or thymus gland ; enlarged masses of absorbent glands in tuberculosis, or in Hodgkin's disease—lymphadenoma ; fibro-cellular, fibrous, or fibro-fatty tumors ; inflammatory exudation and abscess ; very rarely masses of steatoma or hair.

Symptoms.—The symptoms are mainly those indicative of pressure, and they accordingly present the usual variations. “Currant-jelly” expectoration is said to be common in cancer. There may be constitutional symptoms of this diathesis. The physical signs of a solid tumor are also widely different, but the following list will suggest those which are to be sought for: 1. Local bulging, especially in front, of variable extent, often irregular, not pulsating. 2. Deficiency or absence of respiratory movements over the seat of the growth, or in some instances over the whole of one side, from pressure on a bronchus. 3. Altered percussion sound, often over a considerable area, it being either dull and toneless; hard, wooden, and high-pitched; or occasionally tubular or amphoric, there being also marked resistance. 4. Respiratory sounds weak or absent, blowing or tubular, according to the size of the growth and its relation to the main air-tubes. 5. Vocal fremitus usually absent, and vocal resonance either deficient, bronchophonic, or pectoriloquous. 6. Dry and moist rales in the bronchi, either general, unilateral, or local, which are not infrequent. 7. Displacement of the heart and other structures, increased conduction of the heart-sounds, and occasionally a murmur, resulting from pressure on a great vessel.

Diagnosis.—Mediastinal tumor has in the first place to be distinguished from other morbid conditions within the chest, especially chronic pneumonia, chronic pleuritic effusion, pericardial effusion, and enlargement of the heart. Careful consideration of the history of the case, as well as of its symptoms, physical signs, and progress, will rarely leave much doubt as to the diagnosis thus far. It is much more difficult, however, to determine the nature of any mediastinal enlargement. In the diagnosis between aneurism and a solid tumor, when this is at all doubtful, the following considerations have weight, which have been chiefly compiled from the observations of Dr. Walshe: 1. The facts of the patient being a female and under twenty-five years of age, point to a solid tumor; the family history may be suggestive of cancer, or the occupation may be in favor of aneurism. 2. As regards symptoms, dysphagia and severe pain, especially posteriorly, are more common in aneurism; œdema of the arm and chest, frequent hæmoptysis, and current-jelly expectoration are more characteristic of tumor. Occasionally cancer elements may be discharged in the sputa. 3. The physical signs are of much value. The limitation of such signs to the region of the aorta, the presence of any thrill, a double impulse, especially with doubling of the diastolic share, and gradual approach of any pulsation to the surface, are suggestive of aneurism. Great superficial extent of dulness, absence of any heaving character in the pulsation, should this sign be present, and the want of accordance between it and the maximum dulness, are in favor of a solid tumor. 4. Careful examination may reveal cancer in other parts, or there may be constitutional indications of its presence.

With regard to the distinction between different solid enlargements, all that can be stated is that cancer is the most common; there may be signs of the cancerous cachexia or of cancer in other parts; while abundant hæmoptysis is by far most frequent in this form of tumor, or cancer-cells may be expectorated. It also grows outwards, and has a rapid progress. Lymphadenomatous growths must, however, be borne in mind, as they are likely to be mistaken for cancer.

Treatment.—All that can be done is to relieve symptoms as they arise.—FREDERICK T. ROBERTS.

MEDICINAL RASHES.—Some medicines when taken internally bring out on the skin an efflorescence, a fact which it is well to be acquainted with. Thus arsenic is said to excite in rare instances herpes zoster, and to lead to induration of the palms of the hands. Iodide of potassium may induce an acne, and very rarely a bullous eruption, with fever and great constitutional disturbance (see Iodide of Potassium Rash).

Bromide of potassium excites a somewhat similar acne, as well as other phases of eruption due to inflammation of the sebaceous glands (see Bromide of Potassium Eruption). It is not very unusual to meet, whilst administering copaiba, with a raised, red, uniform, terribly pruritic, hyperæmic rash, which now and then goes on to vesiculation. It attacks the arms in chief measure. Scarlatiniform eruptions have been met with also during the exhibition of chloral, salicylate of soda, belladonna, morphia, but they must be looked upon as of very exceptional occurrence. Quinine eruptions have been recorded a considerable number of times now, and they assume usually a scarlatiniform or urticarial aspect.

The external applications of various drugs and vegetable juices are well known to produce eruptions. We need not refer to the causation of blisters and ulcers by caustics, etc. Arsenic commonly excites an inflammation of the skin, and it is an active agent in giving rise to the erythema, papules, vesicles, pustules, and ulceration following the wearing of (a) articles of clothing brilliantly colored by the aniline dyes; (b) green ball-wreaths, artificial flowers, etc. Many dyes, even apart from the arsenic, are capable of exciting a mild dermatitis. Strong mercurial or tartar emetic ointments will occasion a pustular eruption, as will also croton oil. Undiluted arnica may cause very severe inflammation. Tar brings out an acne, and sulphur a papular and then a vesicular eczema.

Amongst the irritant juices of plants, which occasion an inflammation of the skin, that of the nettle is well known. For America two species of rhus (viz., the poisonous sumach or dogwood, and the poison ivy or oak) excite in some persons, by contact or proximity to the plants, an erythematous though usually vesicular eruption of very extensive and often severe character.—*Epitome of Skin Diseases*, *Fox*.

MEDINENSIS—*See Guinea-worm Disease.*

MELANCHOLIA.—A state of melancholy is often the first indication of mental disease, as a disorder of the intellect with depression, and often with suicidal tendency. It may precede mania, and it is associated with or supervenes upon other forms of disorder of the intellect. It may come on suddenly, as when it is the immediate consequence of grief; or gradually, as the mere exaggeration of a naturally melancholy frame of mind. Sudden melancholia is rare. Premonitory symptoms generally indicate a period of incubation more or less prolonged and sufficiently obvious. A state of depression often follows upon a state of mental elation, or on prolonged mental exertion and occupation, which suddenly ceases. It also succeeds the mental exaltation produced by inebriating drinks. These effects, however, are generally slight and transient, and the cases of this kind ought to be separated from those cases in which the depression becomes persistent; in which the "relish for existence" becomes less and less, the spirits become depressed, and the man feels unequal to the ordinary duties of public life, In the domestic circle he becomes silent and seeks entire solitude. His propensities are to indolence and general indifference. He reads nothing, writes to nobody, shuns all exertion One dominant propensity alone is too often active—namely, self-destruction ; while obstinate abstinence from food and drink is a common feature. There is greatly increased susceptibility of the emotions, so that trivial circumstances easily move to tears ; all consolation being disregarded. Occasional remissions of the affection may deceive the patient's friends for a time; but the disease progresses till the patient is either placed under the care of competent guardians, or he voluntarily seeks the tranquillity of an asylum. Fortunately for the chances of cure, a love for the appreciation of the ridiculous is often associated with the tendency to melancholia. The ultimate course of cases of melancholia tends to pass into dementia; but the tendency thereto is much less marked than in mania. The prognosis is more favorable in simple melancholia than when complicated with other disorder of the intellect. Among the earliest mental phenomena are—forgetfulness, abstraction, simple depression of spirits, alterations of the affections towards children or other near and dear relations, restlessness, religious dreads, delusions, alterations of the instincts, such as hunger. "Among the earliest physical symptoms of melancholia are loss of sleep, and disturbed dreams. The digestive organs are frequently deranged, the tongue is unnaturally red or loaded, sometimes flabby, pale, indented at the edges; there is fulness at the epigastrium; the alvine evacuations are deficient in bile; a fixed dull pain, or an ill-defined sense of oppression is often experienced in the head. The pulse is generally slow and impressible. The urine pale, sometimes high colored, depositing lithates. The skin is usually harsh, but not unfrequently it is moist and clammy. The urine functions are more or less disordered, and in a large majority of cases are suspended. In men the reproductive instinct is in abeyance." The attitude is characteristic. The head is bowed on the chest; answers are given to questions with effort and in monosyllables, or after a considerable pause. The patient is apathetic, taciturn, or absolutely silent.

This disease comes next in frequency of occurrence to mania. It is often hereditary ; and all its varieties are disposed to be remittent.

The special forms which melancholia assumes are—(1.) Religious; (2.) Hypochondriacal; (3.) Nostalgic.

In religious melancholy the impress is given to its character by the religious tendencies of the patient. In hypochondriacal melancholy the morbid mental state is expressed by the exaggeration or increase to a morbid degree of intensity, of that property which every one possesses of creating around him or within himself, sensations; but which are not the result of external impressions or corporeal conditions; but which,having their origin in the mind (subjective) are represented and appreciated by the material organs of the body. It consists essentially in the transference of a phenomenon (subjective or mental in its origin and essence) into what appears to be a real material change, appreciable sometimes by others. It is often expressed by the sense of touch, combined with a morbid imagining, so that the patient believes himself to be strangely metamorphosed, changed into some inanimate thing, or he loses all knowledge of his personal identity; and this form of disease is sometimes combined with other delusions.

The affections are, as a rule subverted, and those who ought to be most dear to the patient by the ties of relationship become most hateful. The mind is commonly swayed by some destructive passion to effect some object criminal in itself. Hypochondriasis is often one of the worst concomitants or sequelæ of dyspepsia, and when disorders of the intellect assume the form of hypochondriasis, and are at the same time associated with real lesions of the body, the complication is often very embarrassing to the physician, from the disturbed, exaggerated, or false statements of the patient.

Nostalgic Melancholia (nostalgia) makes itself obvious by an inordinate desire to return to one's native country when far away from home, and to which is added the apprehension, on the part of the patient, that he may never be able again to see his native land. The prophecy of the inspired writer (Jer. xxii. 10) seems ever ringing in his ears,—Weep ye not for the dead, neither bemoan him; but weep sore for him that goeth away: for he shall return no more, nor see his native country." Army surgeons often witness such cases of home-sickness. Decided aberration of mind is present, expressed by exaltation of imagination, especially in extravagant delusions respecting home. This mental excitement is accompanied by increased heat of the head and acceleration of the pulse. There is redness of the conjunctiva, and unusual movements of the patient are frequently observed. Uncertain pains occur in various parts of the body. There is a general feeling of oppression and weariness; an inability to fix the attention; and conversation is apt to be unconnected. A sense of weight and pain pervades the viscera. Under these circumstances prostration of strengh ultimately becomes extreme, mental depression keeps pace with the decline of the body, the patient lies weeping, sighing, or groaning, and a propensity to suicide is not unfrequent when the debility becomes extreme. General paralysis is common: but death is the result of a gradual exhaustion of the vital powers. The Dutch, the Swiss, the Highlanders, and the Irish, are those soldiers amongst whom this form of insanity has been mostly noticed and the disorder is apt to be prevalent during extreme height of the barometer.—WILLIAM AITKEN.

MELANODERMA.—This term includes all cases in which dark stains are produced through some special condition of the body, such as pregnancy, intemperance, etc.

MENINGITIS.—ACUTE CEREBRAL MENINGITIS.—*Definition.*—Inflammation of two membranes of the brain, the pia-mater and arachnoid. *Varieties.*—Acute simple meningitis, rheumatic meningitis, and senile meningitis. *Causes.*—Among the predisposing causes are age, sex, extremes of temperature, profession and habitude, excessive intellectual exertion, abuse of alcoholic liquors, tertiary syphilis, gout and rheumatism. According to the cases observed men between the ages of thirty and forty are most prone to this affection. Of exciting causes, injuries of the head from falls or blows of different kinds stand first. Next is exposure to the direct rays of the sun or other source of great heat, and then recession of an exanthematous affection, such as scarlatina, measles, or erysipelas, and the irritation of dentition, or intestinal worms. *Symptoms.*—These may be divided into three groups: those of the stage of invasion, of the stage of excitation, and the stage of collapse. Of the first stage the most prominent symptom is headache, which may be diffused or confined, flushed face, red and suffused eyes, vomiting and decided elevation in the temperature of the head. These symptoms are accompanied by fever characterized by restlessness, and insomnia, with occasionally a tendency to somnolence. The second stage is ushered in by a chill, higher fever, hotter skin, and quick, hard and frequent pulse; the pain in the head is increased in violence, and is augmented by pressure or even the slightest movements. The pupils are contracted and painfully sensitive to light, general sensibility is increased, there is furious delirium, hallucinations of hearing and sight are present, incoherency of speech, violent gesticulation and alternate laughing and weeping, the limbs are in almost continual action, as are the jaw and eyelids, there are twitchings of the facial and other muscles, and convulsions when they occur may be either clonic, tonic, or both. Sometimes there is opisthotonos. The bowels are obstinately constipated, and there may be difficulty of swallowing and irregularity of breathing, from implication of the muscles of the pharynx and those of respiration. The third stage is characterized by somnolence, with a tendency to coma and stupor, and a subsidence of the delirium and muscular agitation. Ere long the coma becomes constant, paralysis, motor and sensory supervenes, and the patient dies generally from gradual engorgement of the lungs, sometimes from asphyxia. *Prognosis.*—Always grave. Death takes place generally before the tenth day, and occasionally in a very few hours. When the disease is prolonged beyond the tenth day the prognosis becomes more favorable. The occurrence of strabismus and hiccough are unfavorable events. *Treatment.*—To afford any chance of a favorable result, the treatment should be energetic from the first. General blood-letting may be practised with advantage in subjects of good constitution and of the middle period of life. As many as twelve or sixteen ounces may be taken from the arm if the pulse is hard, the cephalalgia intense, or the delirium furious. Leeches applied behind the ears or to the inside of the nostrils are more generally of advantage. The hair should be cut off short and ice kept constantly applied to the scalp during the first and second stages; compresses wrung out of cold water will not answer, as they become warm and act as poultices. Purgatives are advantageous. Nothing is better than croton oil, although calomel and podophyllin, grs. x, with grs. ij, make a good combination for the purpose. Calomel in doses of a grain every two hours until the breath becomes fetid is beneficial. Bromide of potassium is of great benefit and should be given in doses of at least thirty grains three or four times a day from the very beginning of the affection to the end of the second stage, or the appearance of coma. The head should be kept well elevated, the chamber cool and well ventilated, the light in a great measure excluded, and the utmost quiet enjoined. The food, without being stimulating, should be nutritious. Nothing is superior to strong beef tea, made either from fresh beef or from some one of the extracts in the market. In the third stage the treatment should be almost the reverse of that indicated as proper for the first and second stages. The mercury, bromide of potassium, ice to the head, and purgatives should be omitted and attention should be given to the maintenance of the strength. To this end, brandy, whiskey or other alcoholic liquor should be administered in such quantities as the occasion seems to require. It often happens in this stage that the delirium and excessive motility returns, not from any renewal of morbid processes within the cranium, but from debility, and this requires stimulation, not depletion. Blisters may be used in this stage with advantage. They are best applied between the shoulders, and should be six or eight inches square. In the rheumatic form of the disease little special treatment is necessary. In the senile form, active depletion is not so generally admissible, and if indicated should be carried out cautiously.

Chronic Cerebral Meningitis. — *Varieties.* — Chronic verticular meningitis and chronic basilar meningitis. *Causes.*—Those of the verticular are often difficult to make out; sometimes it may be an acute attack, or it may be due to blows or falls upon the head, or to exposure to the heat of the sun or to artificial heat. It may be induced by mental influences, anxiety and other forms of emotional disturbance. The most common cause, however, of this variety is excessive abuse of alcohol. Syphilis, rheumatism, gout, and tubercular deposits may operate as causes in some cases. The most frequent cause of the basilar variety is syphilis, next alcoholic abuse and excessive emotional disturbance, as business anxieties; next in frequency come atmospheric vicissitudes, blows on the head, and attacks of other diseases, as scarlet fever, and especially epidemic cerebro-spinal meningitis and suppurative otitis. Men are more subject to it than women, and adults than children. *Symptoms.*—Of the verticular variety, are headache felt in the forehead or one or both eyes, or the vertex, aggravated by mental or muscular exertion, or by a dependent position of the head, and which is persistent rather than intense, frequent attacks of vertigo, somnolence, trembling, defective articulation, weakness of the limbs, spasms of particular muscles or groups of muscles, paralysis of the bladder, or of the sphincters of the bladder and rectum, weakness of the memory, and general enfeeblement of the mental faculties; occasionally there are epileptic convulsions, paralysis of the whole of one side of the body, or loss of power confined to a single limb or to a group of muscles; anæsthesia, either general or local, or neuralgic pains in various parts of the body. The stomach is irritable, the bowels obstinately constipated, the urine scanty and high-colored, often containing oxalate of lime, and an excessive amount of uric acid, and there is frequent vomiting. The mental and physical symptoms become more and more pronounced, a state of continued coma supervenes, during which the patient expires or death takes place in convulsions. Of the basilar variety, the first decided symptom is sometimes an epileptiform paroxysm or convulsive movements of a limb, group of muscles or single muscle, unattended with loss of consciousness. Ordinarily, however, the primary serious indication of intercranial disease is paralysis, which may appear in the head, arm, hand, or single finger, or one side of the tongue may be affected. In the majority of cases some one of the motor nerves of the eyeball is first involved, and this is generally the third nerve of one side, resulting in ptosis, external strabismus, diplopia, dilatation of the pupil and defective power of accommodation. Occasionally the first sign of the disease is aphasia, with or without vertigo, confusion of ideas, or loss of consciousness. Intense persistent pain, lasting without interruption night and day, and located in the head or face, may be the only disturbing symptom. Vertigo, defective vision and hearing are sometimes prominent symptoms. *Prognosis.*—The prognosis in the verticular variety is unfavorable, unless the disease is of syphilitic origin, when the prospect of recovery is good, if the patient is early subjected to proper treatment. In the basilar variety the prognosis is very much influenced by the etiology. When due to injuries or abuse of alcoholic liquors it is unfavorable; when induced by mental influences or syphilis, and properly treated, the prognosis is favorable; subsequent attacks, however, may occur, and generally run an unfavorable course. In children and aged persons a fatal termination is to be expected. *Treatment.*—The treatment depends to some extent upon the cause, although the general management of the disease is not subject to any essential variation. The iodide of potassium is in all cases the agent most to be relied upon. When the affection is due to syphilis the iodide of potassium must be administered with more persistency and in larger doses than when not so associated. In all cases it must be given in large doses and continued for several months. In uncomplicated cases ten grains three times a day, gradually increased to thirty grains for each dose, may be given. In syphilitic cases the dose will often have to be carried to eighty, or even a hundred grains thrice daily. The iodide of potassium should always be given in gradually increasing doses. This is best effected by using a saturated solution of the medicine in water, each minim of which contains about a grain of the salt. For the first day ten minims three times a day may be given, for the second eleven, and so on till the maximum dose is reached. The bromide of calcium, in doses of about fifteen grains daily, may be very advantageously given, in addition to the iodide of potassium; it may be combined with the latter drug. It must not be forgotten that these medicines act better and are less liable to irritate the stomach, when they are well diluted; they should be taken in half a tumbler of water. Under the combined action of these two drugs the relief is often very striking. In syphilitic cases, where the primary disease is recent, mercury in the form of the biniodide, or the bichloride, in doses of the sixteenth of a grain, two or three times a day, is of service as an addition to the other measures. For the relief of the pain a pill containing half a grain of codeia may be prescribed with advantage as often as required. As regards local medication, blisters to the nape of the neck are occasionally beneficial. The patient should be instructed not to over-exert the mind, to avoid all causes of excitement, mental or physical, and live in strict accordance with hygienic principles. In the basilar form of the disease, in addition to the measures detailed, other means of treatment are rendered necessary by the existence of paralysis, and these ordinarily consist of strychnia and some forms of electricity. The strychnia should be given in gradually increasing doses, or injected into the paralyzed muscles, and the interrupted primary or galvanic current applied over them. Fine and highly nutritious foods are frequently productive of amelioration.—WILLIAM A. HAMMOND.

MENINGITIS, Epidemic Cerebro-Spinal—*See Cerebro-Spinal Fever.*

MENINGITIS, Epidemic—*See Cerebro-Spinal Fever.*

MENINGITIS, Tubercular—*See Tubercular Meningitis.*

MENINGOCELE.—A congenital hernia of the membranes of the brain. When such a tumor contains brain, it is termed an encephalocele.

Causes.—Probably a combination of imperfect development of the skull-wall with a tendency to hydrocephalus.

Signs.—A tumor situated in the line of one of the sutures, usually in the median line and towards the occiput, sometimes at the root of the nose, or even in the pharynx. Occasionally there is a peduncle. Bluish, or color of natural skin, transparent, pulsating with the brain and with respiration. Sometimes compression of it will cause convulsions. More or less marked by hydrocephalus almost always coincident.

Prognosis.—Almost hopeless as to ultimate recovery. A small, pedunculated tumor without symptoms of hydrocephalus would give the most hope

Diagnosis from nævus or from congenital cysts may be difficult. "The diagnosis" of meningoceles and encephaloceles "rests first upon their congenital occurrence and position, at one of the membranous portions of the foetal head; next upon their fluid nature; thirdly, upon their considerable and decided increase in volume or tension, with strong expiratory efforts; fourthly, upon their reducibility in part or entirely; and fifthly, upon their sharing in the motions of the brain." (Holmes, in his System of Surgery, vol. v., p 968).

Treatment—Support carefully and gently with a smooth soft pad and bandage. Puncture justifiable when increase is continuous. Injection of iodine has been tried, with doubtful success. Annandale ligatured and excised successfully in a somewhat exceptional case.

MENORRHAGIA.—*Definition*—Abnormally profuse menstrual flow.

Causes.—Plethora, areolar hyperplasia, granular inflammation of the cervix, fibrous tumor, polypi, epithelioma, chronic ovaritis (?), subinvolution of the uterus, retroflexion, constipation.

Symptoms.—Increased menstrual flow, emaciation, pallor, sterility, dyspepsia, hysteria.

Signs.—If due to any of the above causes, the signs of such maladies will be present. Menorrhagia should not be passed over as if it were necessary to "change of life," but the cause carefully explored.

Diagnosis.—If not due to any apparent cause, the uterus should be investigated by the touch, uterine sound, and speculum, the whole pelvis explored, and if necessary the cervix dilated with tents in order to examine the interior of the uterus.

Prognosis.—Depends on the discovered cause.

Treatment.—Entire rest, cold applications to the vulva and thighs, cold drinks, gallic acid, ergot, opium; intrauterine injections during the intervals of the catamenia, of carbolic acid and glycerin, iodine, persulphate of iron (?); in cases of retroflexion, reposition of the uterus after local depletion; change to a cooler climate. Care must be taken that the menorrhagia is not natural, lest it be unwisely checked. Cases due to definite causes must be treated accordingly.—HEYWOOD SMITH.

MENSTRUATION, Vicarious—*See Vicarious Menstruation.*

METACARPUS, Dislocation of—*See Dislocations.*

METACARPUS, Fracture of—*See Fractures.*

METATARSUS, Dislocation of—*See Dislocations.*

METATARSUS, Fracture of—*See Fractures.*

METRITIS.—*Definition.*—Inflammation of the parenchyma of the uterus; uncomplicated, rare.

Causes.—Mechanical injuries, as operations on the uterus; excessive coitus at catamenial period; intra-uterine or other pessaries, tents, incautious use of the uterine sound.

Symptoms.—Violent pelvic pain, with general tenesmus, nausea, vomiting, and diarrhœa. Pain increased by defecation, and extending down thighs.

Signs.—Great tenderness over the uterus. Examination per vaginam reveals the uterus lower than normal, swollen, os dilated, and the organ very tender; vagina hot and dry, unless there is also endometritis.

Diagnosis.—Differential diagnosis from pelvic peritonitis by mobility of uterus, tenderness confined to uterus; from cellulitis by absence of deposit; from endometritis by the uterus being more swollen and constitutional symptoms graver.

Prognosis.—Duration two or three weeks. Termination in resolution or abscess.

Treatment.—Absolute rest; leeches to the cervix uteri, poultices, opium in full doses; mild diet.—HEYWOOD SMITH.

METRITIS, Puerperal.—*Definition.*—Inflammation of the uterus in the puerperal state.

Causes.—Chill, septicæmia, mental shock, unskilful use of instruments, roughness in the operation of turning, difficult labor.

Symptoms.—Rigor, hypogastric pain, pinched countenance, arrest of lochia.

Signs.—Uterus swollen, very tender; pulse frequent, full, and incompressible; temperature high.

Diagnosis.—From septicæmia by prominence of uterine pain and tenderness; from peritonitis by localization of pain and mobility of uterus, and by absence of primary tympanites; from cellulitis by absence of periuterine deposit.

Prognosis.—Cautious.

Treatment.—Leeches to the hypogastrium and uterus; calomel (gr. 8–10), opium (gr. 2); continuous hot poultices to the hypogastrium; hot injections; quinine in large doses; spare diet.—HEYWOOD SMITH.

METRORRHAGIA.—*Definition.*—Hæmorrhage from the uterus in the intermenstrual periods.

Causes.—Advanced areolar hyperplasia, intrauterine fibrous tumor, cancer, polypi, fungous growths, retained and organized relics of conception.

Symptoms.—Intermittent or continuous hæmorrhage.

Signs.—If due to any of the above causes, the characteristic signs of such maladies will be present.

Diagnosis.—The cause should be diligently looked for; in many cases it is necessary to open up the cervix in order to explore the interior of the uterus, with the view of ascertaining the cause of the hæmorrhage.

Treatment.—Conditions of the cervix to be treated as each case requires (vide *in loco*). For acute hæmorrhage, plugging the vagina; in cancer, the application of strong solution of tannin, or a plug of glycerin, of tannic acid with carbolic acid; in growths from the interior of the uterus, the cervix must be opened up and the morbid growth removed with the curette or with forceps; the application to the cavity of the uterus of nitric acid, nitrate of silver, iodine, carbolic acid, or persulphate of iron. Where a polypus or intrauterine fibroid exists that can be reached, it should be removed.—HEYWOOD SMITH.

MIASM—*See Malaria.*

MIGRAINE—*See Neuralgia.*

MILIARIA.—*Definition.*—An eruption of small transparent vesicles, chiefly on the abdomen, which contain sweat.

Symptoms.—In the course of an acute disease, in which excessive sweating is a prominent feature, small transparent vesicles suddenly appear. At first sight they look like drops of water on the surface, but they are hard to the touch. The vesicles contain sweat, which is proved by analysis. When they burst an eczema may result from the irritation of the sweat.

Treatment.—None is required, unless the disease is accompanied by eczema, which should be treated accordingly.—MALCOLM MORRIS.

MILK FEVER.—Generally in about forty-eight hours the secretion of milk becomes established, and this is occasionally accompanied by a certain amount of constitutional irritation. The breasts often become turgid, hot and painful. There may, or may not, be some general disturbance, quickening of pulse, elevation of temperature, possibly slight shivering, and a general sense of oppression, which are quickly relieved as the milk is formed, and the breasts emptied by suckling. Squire says that the most constant phenomenon connected with the temperature is a slight elevation as the milk is secreted, rapidly falling when lactation is established. Barker noted elevation, either of temperature or pulse, in only 4 out of 52 cases which were carefully watched.

There can be little doubt that the importance of the so-called "milk fever" has been immensely exaggerated, and its existence, as a normal accompaniment of the puerperal state, is more than doubtful. It is certain, however, that, in a small minority of cases, there is an appreciable amount of disturbance about the time that the milk is formed. Many modern writers, such as Winckle, Grunewaldt, and d'Espine, entirely deny the connection of this disturbance with lactation, and refer it to a slight and transient septicæmia. Graily Hewitt remarks that it is most commonly met with when the patient is kept low and on deficient diet after delivery, especially when the system is below par from hæmorrhage, or any other cause. This observation will, no doubt, account for the comparative rarity of febrile disturbance in connection with lactation in these days, in which the starving of puerperal patients is not considered necessary. It is certain that anything deserving the name of milk fever is now altogether exceptional, and such feverishness as exists is generally quite transient. It is also a fact, that it is most apt to occur in delicate and weakly women, especially in those who do not, or are unable to, nurse. There does not, however, seem to be any sufficient reason for referring it even when tolerably well marked, to septicæmia. The relief which attends the emptying of the breasts seems sufficient to prove its connection with lactation, and the discomfort which is necessarily associated with the swollen and turgid mammæ, is, of itself, quite sufficient to explain it.—W. S. PLAYFAIR.

MOLE PREGNANCY.—*Definition.*—A spoiled egg. The life of the ovum is destroyed and subsequently expelled as a misshapen mass: or the fœtus may die from hydatidiform degeneration of the chorion.

Causes.—Unknown. Syphilis (?).

Symptoms.—Those of pregnancy, and afterwards some or the signs of death of the fœtus; the abdomen ceases to enlarge, and the mammæ become flaccid; discharge of water with small cyst-like bodies.

Signs.—Absence of fœtal circulation, softness of the uterine tumor, bimanual examination revealing want of firmness of the uterus; on passing the finger into the os uteri a soft placental-like mass is felt.

Diagnosis.—Not difficult, if attention is paid to the symptoms and signs.

Prognosis.—Favorable.

Treatment.—Dilate the os uteri and empty the uterus of its contents; ergot to insure proper contraction.—HEYWOOD SMITH.

MOLLITIES OSSIUM—*See Bone, Diseases of.*

MOLLUSCUM CONTAGIOSUM.—*Definition.*—A contagious disease of the skin, affecting the sebaceous glands, leading to the blocking up of the duct and an increased growth of the gland, which becomes filled with a white, fatty, and granular substance.

Symptoms.—The cause of the disease is unknown, but there is no doubt that it can be communicated from one person to another, although the mode has not been yet discovered. The disease appears first as a minute hard, white, shiny swelling, which gradually grows until it becomes as large as a hazel-nut, but it is usually about the size of a pea. This little tumor, which may be sessile or pedunculated, is circular in form, with a flat top, having in its centre a small depression, which is the mouth of a sebaceous gland, and from which, when the tumor is squeezed, a soft, white, milky substance is forced. The tumors may occurr singly or in scattered groups on the face, especially the eyelids, chest, arms, genitals, and on the breasts in women, and cause no pain, tenderness, or irritation, but occasionally producing, when inflamed, an ecthymatous pustule. As the tumors dry up, small horns or warts are sometimes left. The disease is more common in children than in adults.

Diagnosis.—It is easily recognized by the umbilication and ease with which the tumor can be emptied, and is not liable to be mistaken for any other disease.

Treatment.—Treatment consists in making an incision across the tumor with a sharp knife and then squeezing out the contents.—MALCOLM MORRIS.

MOLLUSCUM FIBROSUM (Fibroma)—*See Tumors.*

MONOPHOBIA—*See Fear, Morbid.*

MORBILLI—*See Measles.*

MORBUS COXÆ—*See Hip Disease.*

MORPHŒA.—*Definition.*—Morphœa is a rare chronic affection of the skin, characterized by the occurrence—most often on the face—of roundish or oval pale-pink or ivory-colored patches, which are firm and inelastic, and therefore are not easily pinched up into folds.

Symptoms.—Patches of one to three inches in diameter appear on the skin in the course of some cutaneous nerve, with a pale-yellowish or ivory-like centre, smooth surface, and a well-defined violet or lilac-tinted margin. The corium, apparently dense and thickened, appears to be bound down to the subcutaneous tissue. A feeling of burning or tingling sometimes attends the development of the patches, and there may be slight pain on pressure, but usually no alteration in cutaneous sensibility.

When the patches appear on the face they are sharply limited by the middle line, and may occur in the area of distribution of the supraorbital nerve or other branches of the fifth, but on the trunk and limbs they are arranged in a somewhat similar manner as in herpes. Pigment is occasionally deposited in the skin around the patch, and its absence or presence distinguishes the varieties morphœa alba and morphœa nigra. Owing to the infiltration and rigidity of the skin, the movements of the facial muscles and of the joints, when the skin of these parts is the seat of the disease, are much impaired, so that the fingers remain semiflexed and cannot be either bent or extended, and the expression of the face becomes stony and fixed, like that of a frozen corpse. The sweat and sebaceous secretions, and the growth of hair on the hide-bound patches, are frequently deficient, and the temperature is usually 2° to 3° Fahr. lower than that of the healthy skin, but there is no special trophic change in the parts affected.

The morphœa patches slowly extend, and having reached their acme may, in the course of years, gradually fade, and leave the skin perfectly normal or only slightly pigmented. However, occasionally sclerosis takes place, and the thin, rigid skin acquires a shrunken, parchmentlike appearance, which has been termed morphœa atrophica.

Diagnosis.—Patches of morphœa differ from leucoderma, which they resemble in color and definition, by the hard, infiltrated, and inelastic consistence of the affected skin.

The pale patches of lepra maculosa differ from those of morphœa by being anæsthetic in their centre and usually symmetrical in their distribution, while the former disease is accompanied by affections of the nerves, cutaneous tubercles, etc., which never occur in morphœa.

Keloid can hardly be mistaken for morphœa, so forcible is the contrast between the raised, pinkish, clawlike nodule of the former and the level, pale, smooth patches of the latter.

Prognosis.—Morphœa is never fatal. The disease in some cases tends slowly towards involution, and the normal elastic condition of the skin is restored; but when sclerosis and atrophy have occurred, permanent deformity is the result.

Treatment.—No local treatment has proved of any avail, but as general remedies tonics, such as iron, quinine, and cod-liver oil, are indicated if the case is complicated by anæmia or struma.—MALCOLM MORRIS.

MUMPS.—*Etiology.*—Mumps is probably an acute specific disease, and there is every reason to believe that it is infectious. Almost always the complaint assumes an epidemic form, but it may be localized in houses or institutions where a number of young persons are aggregated together. It rarely occurs except in young individuals, being very common about the period of puberty, and also from five to seven years of age. Males are much more frequently attacked than females. Epidemics are most common in spring and autumn.

Anatomical Characters.—Mumps is chiefly characterized anatomically by inflammation of one or both parotid glands. Some pathologists are of opinion that the process begins in the cellular tissue which pervades the gland structure; others believe that a catarrh of the gland-ducts first occurs. The affected gland is hyperæmic and enlarged, being infiltrated with a serous fluid. Fibrinous exudation is not often observed, and a most important point to be noticed is that extremely rarely is there any tendency to the formation of pus. The tissues around are more or less infiltrated. As a rule the swelling rapidly subsides and the gland returns to its normal condition. Occasionally the submaxillary gland is involved, and the testicles or other parts may be the seat of metastatic inflammation.

Symptoms.—The period of incubation for mumps varies from fourteen to twenty-two days. In most cases there is some degree of premonitory fever, which lasts from one to three days before local symptoms are manifested, but occasionally they come on simultaneously. Pyrexia usually continues throughout the attack, but may subside on the appearance of the local signs, and it is seldom severe, nor does the patient feel particularly ill. A swelling or fulness appears in the region of either parotid gland, commencing just below the external ear, and then extending up to the zygoma, as well as to a variable extent over the face and down the neck, thus giving rise to much disfigurement. It has an elastic feel, being firmer over the centre than at the circumference. The skin may be reddened over the swelling, but is frequently unaltered. More or less pain or uneasiness is felt, with a sense of tension, increased by opening the mouth, by masticating, or by swallowing; there is also tenderness on pressure. Salivation occurs now and then, and occasionally deafness is complained of. In the great majority of cases the swelling subsides about the fifth or sixth day, and has quite disappeared in two or three days more; but in the meantime the gland on the opposite side frequently becomes affected and goes through a similar course, or both glands may be involved simultaneously. A hardness occasionally remains for some time; and in very exceptional instances abscesses form in the gland, which open externally or into the external auditory meatus. The submaxillary gland is sometimes attacked, and the surrounding lymphatic glands, as well as the tonsils, are often enlarged.

An important character of this disease is its liability to metastasis, especially in adults. This event may be preceded by some dangerous symptoms. The testicle is most frequently attacked, orchitis setting in as the inflammation subsides in the parotid, with effusion into the tunica vaginalis and œdema of the scrotum. Occasionally the parotid and testicle are affected at the same time, or alternately for several times in succession. The orchitis generally runs a favorable course, but it may lead to wasting of the testicle. In females the labia, mammary gland, or ovary may be attacked in the same way. Meningitis has been stated to have occurred in very rare instances.

Treatment.—In most cases of mumps but little treatment is required. It is necessary to keep the patient indoors, in a comfortable room, or even in bed if the complaint is at all severe. An aperient is useful at the outset, and the bowels should be kept regularly open. Saline medicines may be given, so as to promote the action of the skin and kidneys, and during convalescence quinine is serviceable. The diet should consist of liquids, especially milk and beef tea. The only local treatment generally needed is to use hot fomentations, and to cover the part with cotton wool. The application of a leech or two may possibly be required. If an abscess forms it must be opened, and any hardness that is left may be removed by friction with oil, or by painting the surface with tincture of iodine. When metastatis takes place, it is recommended to endeavor to excite the return of inflammation in the parotid by means of mustard poultices or blisters. Orchitis must be treated by means of rest, fomentations, and other appropriate measures.—FREDERICK T. ROBERTS.

MUSCLES, Diseases of.—The chief are: 1, Atrophy and degeneration; 2, contractions; 3, inflammation; 4, paralysis; 5, parasites (trichiniasis); 6, syphilitic affections; 7, tumors. Some of the above are primarily nervous affections, but they are mentioned here for the sake of completeness.

MUSCLES, INFLAMMATION OF.—Chiefly occurs as an extension from inflammation of neighboring parts, or as a result of injury, or of syphilis. Liable to end in abscess, which may be very troublesome, especially in certain parts, *e. g.*, abdominal wall. Considerable pain and constitutional disturbance. *Treatment.*—Local rest, poultices, &c.

MUSCLES, ATROPHY AND DEGENERATION OF.—Four chief forms, viz.: 1, simple atrophy; 2, granular degeneration; 3, fatty degeneration; 4, "waxy" *e. g.*, in chronic joint disease. Microscopically there are abnormally few striated muscle fibres, and the appearance becomes more that of fibrous tissue. Waxy degeneration occurs as a sequel of continued fevers. All the forms of degeneration are found in progressive muscular atrophy. The microscope shows in the case of fatty degeneration numbers of fat-cells in the place of the muscle fibres, and in the case of waxy degeneration, a "homogeneous, colorless, glistening mass."

PROGRESSIVE MUSCULAR ATROPHY.—Vide.

Muscles, Contractions of.—*Causes.*—Inflammation of, or abscess in the muscle; 2, disease of nerves or nerve-centres; 3, reflex irritation, *e. g.*, from worms (intestinal irritation), phimosis (sexual irritation); 4, "antagonism," *i. e.*, contraction of one set of muscles because its opponents are paralysed; continued relaxation of a muscle, *e. g.*, the state of the flexors of a limb which has long been kept on an angular splint. Muscles in such a state tend to become permanently shortened. Most cases of paralytic talipes are probably caused by the limb permanently assuming a certain position under the influence, not, as was formerly supposed of true "antagonistic" contractions, but of mere gravity; 6, mal-development; but a muscle which has never been developed to its proper length cannot be properly termed "contracted." The diagnosis of the affection is manifest; that of its cause depends chiefly on the history. *Treatment.*—In a few cases it is sufficient to remove the cause, *e. g.*, to circumcise for phimosis, or to give santonin and scammony for worms. In mild cases, regular manipulation by stretching or continuous mechanical extension may suffice. But usually tenotomy is indicated. See Club-foot. Tenotomy should be followed by mechanical extension, either gradual or immediate and total.

Muscles, Paralysis of.—Almost all cases which the surgeon has to treat may be classified as: 1, those arising from injury to nerves. (See Nerves, Injuries of.) 2, those arising from direct blows on a muscle; 3, infantile paralysis; 4, Duchenne's disease; 5, paralysis from disuse; 6, neuromimetic or hysterical paralysis. Paralysis from direct injury requires rest till tenderness has disappeared; afterwards, manipulation, rubbing, kneading and passive exercise.

Infantile Paralysis.—*Causes.*—Can sometimes, but rarely, be traced to catching cold. Almost, but not quite, exclusively a disease of childhood, from infancy to the fourth year, inclusive. Four times as common in summer as in winter (Sinkler). Similar, though perhaps not identical, paralyses occasionally follow acute diseases, such as measles. *Symptoms.*—Sudden commencement, usually with fever; sometimes with severe cerebral symptoms (deafness, delirium, coma, general convulsions). Very rapidly developed, complete paralysis of certain parts with entire relaxation of the affected muscles. Parts affected, variable. Generally lower limbs. Sometimes one or both arms, or separate muscles, *e. g.*, deltoid. Serratus magnus sometimes affected (Lees, Clin. Soc. Trans., 1879). The muscles atrophy, the development of the bones is retarded, and, the local circulation stagnating, the limbs become cyanotic. But the general health and nutrition remain vigorous, and there is no affection of the sphincters, nor any considerable disturbance of sensation. In the course of time deformities result, *e. g.*, talipes, contracted hip, &c. *Pathology.*—Essentially an inflammation of the anterior horns of the gray matter of the spinal cord, especially in the lumbar and cervical enlargements. *Prognosis.*—Little or no danger to life or general health, except indirectly from the crippling. But little hope of important benefit from treatment, except orthopædic. *Treatment.*—In early stages, treat the main affection vigorously (of course, not forgetting patient's tender age). Strips of blister along spine, near cervical enlargement in case of paralysis of upper extremities, near lumbar when legs are affected. Cathartics. Ergotine, belladonna, or pot. iod. internally. Prone position if possible. Cold affusion for severe head-symptoms. Later on, galvanism. Constant current to spine itself. Large electrodes, one to cervical or lumber enlargement, other to anterior surface of trunk. Alternate place of anode and cathode every two minutes. Persevere, at intervals, for years (Erb). Faradic electricity to affected muscles. Anode to spine or nerve-trunks; cathode to muscles. Fresh air, good diet, cod-liver oil, warm clothing to limbs. Massage, friction, "beating," sea baths. Orthopædic treatment and appliances. To prevent the necessity for these, keep the paralyzed limbs in a good position when at rest. Paralytic deformities are mainly caused by action of gravity, but partially perhaps by antagonistic contraction of the stronger muscles.

DUCHENNE'S DISEASE, OR PSEUDO-HYPERTROPHIC PARALYSIS. Cause unknown. Age, childhood. Three stages: (1) of weakness of muscles of lower limbs; (2) of gradual hypertrophy of, successively, gastrocnemii, glutei, and lumbar muscles, weakness still persisting; (3) of wasting and increased paralysis. The muscular enlargement is due to growth of connective tissue and fat. Idiocy often co-existed. *Prognosis.*—Bad. Quite hopeless in third stage. *Treatment.*—Electricity; manipulation; "shampooing."

PARALYSIS FROM DISUSE is practically identical with atrophy, and requires shampooing, passive or active exercise, and perhaps stimulus of electricity.

MUSCLES, TUMORS OF.—Almost any variety may occur. Sarcomata probably most common. Ossifications of muscles themselves present appearance of hard tumors. Such ossifications sometimes affect the adductors of cavalry soldiers ("rider's bones"). Cysts. Cancer. The *Trichina spiralis*, a nematoid worm, is a parasite which lies encysted in the muscles of patients affected with "Trichiniasis," as the affection is termed.

MUSCLES AND TENDONS, RUPTURE OF.—Tendo Achilles and quadriceps extensor of thigh most often affected. Occurs chiefly in middle age. *Treatment.*—Fix in a relaxed position for a fortnight. Resume use cautiously and gradually.—C. B. KEETLEY.

MUSCULAR ATROPHY, Progressive.—*See Progressive Muscular Atrophy.*

MUSCULAR RHEUMATISM.—*Natural History.*—Pains in muscular structures, (probably due to inflammation of fibrous sheaths) increased by motion. Lumbago, stiff-neck, and pleurodynia, are the three principal local forms of this affection.

Lumbago affects the sheaths of the fleshy mass of the lumbar muscles, or one or both sides of the loins, often extending to the ligaments of the sacrum and ilium. The pain is severe, and generally of very sudden occurrence.

Stiff-neck, or cervical rheumatism, generally follows exposure to currents of cold air on the neck, and affects especially the sterno-cleido-mastoid muscle of one side; and hence the immovable twist of the head to one side, with great pain on movement.

Muscular rheumatism may also affect the muscles of the chest (pectorals, intercostals, insertions of serratus magnus), simulating pleurisy, and hence known as a form of pleurodynia, affecting especially the infra-axillary region, the chief pains being localized in one point, increased on pressure at that point, and of a catching character, so as to prevent a complete respiratory act.

Treatment is by local appliances which ensure rest and warmth—such as in lumbago, strapping the back from the level of the "seat" upwards, in imbricated layers of broad stripes of adhesive plaster (emplas. roborans) spread on doeskin, the back being exposed before a large fire during the process; or over the affected side in pleurodynia, from mid-spine to mid-sternum, and over all a flannel bandage. Subcutaneous injection with morphia gives great relief; but if used for the first time, it must be used with great caution in patients above forty years of age.

Rhubarb, soda, and calumba powder at bed-time may be required to improve stomachal digestion; and an electuary of guaiacum, sulphur, and cream of tartar, in equal parts, with syrup of ginger (one or two teaspoonfuls, in a claret glass of water, in the morning), will tend to improve the secretions from the bowels.—WILLIAM AITKEN.

MYALGIA—*See Muscular Rheumatism.*

MYDRIASIS—*See Iris, Diseases of.*

MYELITIS.—*Natural History.*—Inflammation of the cord may be diffuse, and may terminate fatally, either—(1.) In the acute inflammatory stage; (2.) by ramollissement; (3.) by undefined suppuration; or (4.) by abscess.

The most common affection, however, is ramollissement, in which the substance of the cord is greatly broken down and softened, so as to be sometimes reduced to a mere pulp, or so diffluent as to give the sensation of fluctuation under the finger. This disorganization may embrace the whole thickness of the cord, or sometimes only one of its columns; and the centre or gray substance is more softened than that of the circumference or white substance. The ramollissement may exist in the cervical, dorsal, or lumbar portions; but it is most common in the lumbar, and after that in the cervical portions, or in those parts which contain the greatest quantity of gray substance, and the greatest number of blood-vessels. The part affected is generally swollen—a circumstance more striking than in similar diseases of the brain, because the spinal canal is large in proportion to its contents, compared with the cranium. The softened part is also generally ash-colored or white. Some pathologists have regarded ramollissement of the cord as a particular alteration of the nervous system, resembling the effects of a contusion of soft parts, and the result of shock. It often occurs, however, when no shock has been received, and has not the least resemblance to a contusion of soft parts.

The symptoms of myelitis are in general limited to the functions of parts below the lesion. In a few cases, however, the effects of the lesion are reflected from below upwards. In general, both upper or both lower limbs are affected; and in few instances only one limb. The earliest symptoms are recognized in the fingers and toes, by a feeling of numbness, with a sensation of coldness extending up the limb. Shortly afterwards the patient complains of pain in the back, corresponding to the seat of greatest intensity of inflammation. This is not constant; but when we make pressure with the finger over the spinous processes of the affected part, it is augmented or only then felt; also when a hot sponge or an ice cold one is applied. These symptoms are succeeded by impaired motion, and often likewise by diminished sensation of one or more limbs, followed by paraplegia or other form of palsy. If only one side of the cord be affected, the paralysis which results is confined to one side of the body. When the anterior columns chiefly are the seat of the inflammation, the paralysis which follows is that of muscular motion, but of sensation if the lesion exist in the posterior columns; and if a careful analysis be made of the several cases in which the gray substance of the cord has been implicated, it will be found that the function of reflex action has been deranged. In the early stage, when congestion prevails, there is exaltation of tactile sense and of muscular contraction. Another marked symptom may be often distinguished—namely, a difficulty experienced in walking on first rising after a night's rest—a feature more or less constant in cases of spinal congestion. The palsied limbs may be either relaxed or permanently contracted : thus, the hand may be bent on the upper arm, or a leg be flexed upon the thigh, or the affected limb may be attacked with convulsive twitchings, or may beat incessantly. As the disease advances, the bladder becomes affected, and the patient is incapable of retaining his urine, from the sphincters being palsied. The action of the bowels is slow in the first instance; but towards the close of the disease the patient may be purged, and the stools pass involuntarily. If the disease be the result of an accident, the pulse is at first rapid and full; but if the disease be spontaneous, the pulse is generally natural, until the powers of life are broken down by the continuance of the affection. As death approaches, the nates and the prominent parts of the pelvic region, on which the body rests, ulcerate extensively, so that deep sloughs form; and although the patient, from anæsthesia, may suffer no pain, he nevertheless ultimately sinks exhausted.

In myelitis, and in injuries of the spine from wounds and contusions, some differences in the symptoms have been observed, according to the seat of the injury. Every part of the body which receives its nerves from the spinal cord below the upper level of the structural disorganization is paralyzed; consequently, when destructive myelitis extends throughout the cord to the fifth pair of cervical nerves, the upper extremities are paralyzed, and all those parts which receive their nerve-power from a lower level of the cord are paralyzed too. If again, the spinal cord be lacerated or divided above the origin of the phrenic nerves, or above the third cervical vertebra, death is the immediate consequence, the nervous influence being no longer transmitted with sufficient completeness to the diaphragm and other muscles of respiration.

When the injury, however, is below the origin of the phrenic nerves, or at the level of the fifth and sixth cervical vertebræ, the inspiration is free, but the expiration is laborious, for the intercostal and abdominal muscles are paralyzed, and incapable of assisting in that process. The patient can yawn, for that is an act accompanied by inspiration; but he cannot sneeze, for that is an act accompanied by expiration. At this point, also, the upper extremities are still palsied, both as relates to motion and to sensation. When the palsy of motion and of sensation is complete, the patient, during the short remaining period of his life, presents the extraordinary phenomena of a living head, with its sensibility and muscular powers unimpaired, attached to a trunk and extremities of whose existence he is only conscious by the sense of sight. The circulation of the blood is affected. and the action of the iris of both eyes, through the medium of the sympathetic nerves. Another very common symptom connected with injuries of the upper portion of the cord is priapism, which may show itself about the second or third day after the accident, and generally subsides after the first fortnight. It sometimes occurs even when all sensation in the part itself is destroyed, so that the patient is not sensible of introduction of the catheter.

Treatment.—It may be laid down as a general rule that bleeding ought not to be had recourse to after palsy has occurred ; and it may be stated that so long as the affected muscles are convulsed, rigid, and irritable, the use of antiphlogistics and counter-irritants, is indicated ; but when the means calculated to subdue excitation have failed to arrest the further progress of the disease, and paralysis supervenes, stimulants are the only remedies which restore to functional activity those nerve cells and conducting fibres which are not irretrievably destroyed. Antiphlogistic remedies acting on the alimentary canal so as to produce three or four motions in the twenty-four hours, create such a derivation as in some degree relieves the parts. Of all stimulant local remedies, electricity and strychnine are the most potent and the best; and secale cornutum has been recommended as a remedy possessing the same power as strychnine. When there is no great pressure beyond that which simple congestion produces, nor actual disorganization of the spinal cord, the remedial power of secale cornutum is in some cases very great. It seems especially to resuscitate the muscular contractility of the rectum and bladder, and pelvic viscera generally. It is best given in the form of ethereal tincture, in doses of from ten to twenty drops twice or three times a day. It does not relieve the reflex convulsions, which are sometimes alleviated by prussic acid, digitalis, or belladonna, chlorodyne, chloro-morphine or croton chloral.

After the local pain in the back has been subdued, no remedy is so effectual as strychnia, in the dose of one-twentieth of a grain, repeated more or less frequently (twice or three times a day) according to the evidence of its action. It may be combined advantageously with ipecacuanha in cases where the intestinal mucus seems deficient. The absence of pain and of spasmodic muscular contraction necessitates great caution in determining the precise moment when the spinal cord is likely to be benefitted by the energetic excitement of strychnia. The internal administration of this remedy ought, therefore, to be always preceded by its e xternal use, together with other stimulants in the form of embrocations over the spine, when the stage of excitation has been subdued. Electricity, after the activity of inflammation has been subdued, is a therapeutic agent of great value ; and the continuous current of galvanic electricity seems to be as efficaceous as the induction or intermittent current. But whether galvanism or electro-magnetism be employed, no high degree of tension is required for the restoration of muscular power ; on the contrary, the favorable course of many a case has been retarded by the employment of strong currents.

In cases with a history of syphilis, and where there may be some reason to believe that hardening or induration of the cord or its membrane has taken place, the iodide of potassium may relieve the early phenomena, and by the aid of setons, the progress of the disease may be held in abeyance so long as the discharge is maintained from the seton.

When disorganization of the spinal cord has become an accomplished fact, the disease is incurable ; but yet the exigencies of the patient are not the less pressing on the careful attention of the physician, and in nothing more so than in the protection which is called for against bed-sores, which will sometimes occur in spite of the greatest care.—WILLIAM AITKEN.

MYOCARDITIS—An inflammation of the muscular structure of the heart (extremely rare as an idiopathic disease), which becomes softened, flabby, and finally degenerates, occurs most frequently as a consequence of acute rheumatism, or of pyæmia, associated with endocarditis, or pericarditis, or both ; and its effects are especially obvious in the striata of fibres nearest the inflamed membranes. It is accompanied by proliferation of the connective tissue of the sarcolemma, and absorption of the primitive fasciculi, leading to cicatricial-like contraction of the affected parts. It is not to be diagnosed during life, except as a matter of probability, in connection with rheumatism, tedious and malignant scarlet fever, septicæmia, valvular disease, endocarditis, pyæmia, embolism, or syphilis. Its existence under such circumstances is especially probable if rigors set in, with swelling of the spleen, vomiting, or pain in the region of the kidneys, and albumen or blood in the urine.—WILLIAM AITKEN.

MYODYNIA—*See Muscular Rheumatism.*

MYOMA—*See Tumors.*

MYOPIA.—*See Refraction.*

MYO-RHEUMATISM—*See Muscular Rheumatism.*

MYOSIS—*See Iris, Diseases of.*

MYSOPHOBIA—*See Fear, Morbia.*

MYXŒDEMA—*Definition.*—The deposit of a mucoid substance in various parts of the body, especially in the skin, or a degeneration and proliferation of the connective tissue, giving rise to an appearance resembling anasarca.

Causes.—Sex is a strong predisposing cause, only two cases having been observed in males. Age is a determining predisposing cause, no cases having been observed in those who had not reached middle life. As to the immediate or exciting causes, nothing is known.

Symptoms.—Anasarcous appearance, but distinguished from anasarca by the part not pitting on pressure; puffiness of the eyelids, prominent lips, swollen nostrils; redness of the cheeks over the malar bones from capillary congestion, clubbed hands and fingers, abnormally low temperature, impairment of mental and physical power, loss of memory, perversion of the special senses, sometimes hallucinations or delusions, acute dementia, diminution of general sensibility, sleeplessness.

Prognosis.—Bad. In the cases observed there has been no amelioration from treatment.

Treatment.—Strychnia and other nerve tonics; full diet and electricity have been tried without avail.—William A. Hammond.

NÆVI—*See Tumors, Vascular.*

NAILS.—*Chief Affections.*—In-growth, onychia, hypertrophy and psoriasis.

Nail, In-grown Toe, is really the overgrowth of the flesh at the side of the nail, caused by pressure of boot and by not cutting the nail square. *Treatment.*—Bad cases require perfect rest. With the point of a pen-knife insinuate a little cotton-wool beneath the side of the nail, and between the edge of the nail and the overlapping flesh. Avoid cutting the nail. Poultice and rest thoroughly if there is much inflammation. In a few cases avulsion of the whole nail (of course, under either local or general anæsthesia) may be necessary.

Onychia.—An ulceration of the matrix of a nail. Varies much in severity. The worst cases are termed "Onychia maligna." *Causes.*—Bad constitution; weakly children especially liable; local injury, neglect, syphilis. *Signs.*—Ulceration sometimes confined to one angle of the matrix, sometimes extending along both sides and base of matrix. Nail blackens, loosens, and peels off, perhaps in strips. Sanious, foul discharge. Often great pain. *Treatment.*—Remove nail. Carry hand in a sling beneath chin; poultice a day or two; then dress with ung. hyd. oxid. rubri, or carbolic oil. Nitrate of lead. Ung. iodoformi would be worth trying when inflammation is reduced. ℞ liq. arsenicalis ʒ iij. aquæ ad ℥ ij, m. ft. lotio. Black wash. Internally, give tonics and cod-liver oil.

Hypertrophied Nails should be removed, and measures be taken to protect against local irritation.

Psoriasis of the Nails.—"The central part of the nail becomes thickened, rough and scabrous, and unnaturally convex; the free edge is often split; the cuticular fringe at the bottom of the nail is ragged and retracted, leaving a deep fissure between the nail and the skin of the finger. The whole nail, in an extreme case, resembles the outside of the concave shell of an oyster." (T. Smith). *Treatment.*—Smooth down with sand-paper. Dress at the margin with equal parts of ung. picis liq. and ung. hydrarg. ammon. Constitutionally, give arsenic or antisyphilitics, as may be indicated. Remember that parasitic disease of the nails—"ring-worm"—occurs, but with extreme rarity. May be detected by the microscope.—C. B. Keetley.

NASAL BONES, Fracture of—*See Fractures.*

NASAL POLYPUS—*See Nose, Tumors of.*

NECK, Injuries of—*See Sprain; Throat, Cut; Spine, Dislocations of, &c.*

Neck, Congenital Fistulæ in, called "Branchial Fistulæ," because they are properly due to incomplete closure of the branchial clefts. Very small; usually give exit to a serous discharge.

Neck, Tumors of, are usually enlarged glands, or abscesses resulting therefrom. More rarely, adenomata, cysts, "hydroceles," aneurisms, or cancers. See also Bronchocele. Lipomata not uncommon at back of neck.

Neck, Hydrocele of.—A cystic tumor, usually situated at the base of the posterior triangle. *Contents.*—Yellow or brown serous fluid. *Diagnosis.*—By fluctuation and transparency. *Treatment.*—Tap and inject with iodine.

Wry-Neck.—Depends on contraction of the sterno-mastoid. (Besides true wry-neck, there are hysterical wry-neck and a spurious wry-neck, caused by caries of the cervical vertebræ). *Causes.*—*Vide* Muscles, Contraction of. *Symptoms.*—Distance from ear to sterno-clavicular articulation, shortened on side of contracted sterno-mastoid. Head bent over towards, and face turned away from same side; head also bent downward. Contracted sterno-mastoid feels tense, especially when an attempt is made to raise head. Lateral curvature of spine frequently a secondary result. Arrested development of face on affected side. Other muscles besides sterno-mastoid sometimes contracted, but not so firmly. *Treatment.*—Divide sterno-mastoid subcutaneously, and afterwards fix the head straight, or slightly inclined towards opposite side, by a special machine, or by strapping and bandages. A leather collar sometimes useful in mild cases. *Division of sterno-mastoid.*—Divide close to origin. Divide sternal and clavicular heads separately. Turn edge of knife towards skin, first passing blade beneath muscle. Do not insert knife too deeply, as death has occurred several times from wounds of important vessels. After-treatment must be persevered in for a month or two. Manipulation suffices towards the latter part of the time. For hysterical wry-neck, division of sterno-mastoid is generally rather prejudicial than useful. Treat on the principles laid down for Hysteria, *q. v.* In wry-neck from spinal caries, treat the prime disease.—C. B. Keetley.

NECROSIS—*See Bones, Diseases of.*

NEPHRITIS, Suppurative—*See Kidneys, Suppurative Inflammation in Connection with.*

NERVES, Atrophy of.—May be either general or local. General atrophy is found only in cases of extreme and protracted emaciation, from defect of general nutrition. Local atrophy may be the result of several different causes, viz., chronic inflammation, stretching, compression and even severe contusions. Of these the most common is compression caused by tumors, aneurisms, enlarged glands, etc. Nerves of special sense often waste after loss or wasting of the central organs to which they belong, as the optic nerve after wasting of the globe of the eye. In some instances the nerve fibres only are implicated, and nothing may be left but the neurilemma; in others the neurilemma itself is involved in a greater or less degree. During the process of atrophy, the nerve-fibres become uneven, their white substance is broken at intervals and stripped from their axis cylinders in masses, which again break up into smaller fragments that are mingled with fatty particles.—J. Lockhart Clarke.

NERVES, Concussion of.—Concussion of the great nervous centres, as the brain and spinal cord, has long been a well-recognized surgical accident. The symptoms which follow these injuries have been carefully noted, and are not unfamiliar to the general practitioner, but the pathological changes which they induce are not so well understood. By some writers, it is maintained that some actual lesion of the nerve substance may always be observed in concussion, while others, and the majority, believe there is no appreciable lesion. The division which Dupuytren made of these injuries, depending upon the change produced in the nervous matter, is at once simple and rational. To those accidents which result in no lesion of the nervous centre, but consist of a simple shock, or shaking together, he gave the name commotion, but when there was actual lesion he called it contusion. Commotion of the brain or spinal cord, as thus understood, consists in no sensible lesion of the nerve matter. Dupuytren explained it as a sudden depression of the nervous power; Cooper as a sudden suppression of the circulation in the organ, in which the effort to vomit often relieves, by restoring the blood to the brain. The more prevalent opinion is that there is a disarrangement of the nervous particles, which interrupts the function of the organ ; this explanation is of course conjectural.

Whatever the pathological changes induced in the great nervous centres in simple concussion, the results of this accident are often of the most serious nature. The danger of the immediate inflammatory reaction often requires our most assiduous attention to avert. And even when this critical period has passed and our patient resumes his ordinary pursuits in apparent health, we still regard him as liable to remote and secondary effects of the injury which may terminate in the most serious organic changes in the nervous centres. Thus, patients who have suffered concussion of the brain, and recovered quickly from its immediate effects, have some time after begun to manifest symptoms of cerebral disturbance, which in the lapse of years has finally terminated in the most grave organic changes of this great nervous centre. These remote results of concussion consist of induration of the brain structure, thickening of its membranes, and inflammatory effusions. The functions of the nervous centres become thereby impaired, and the organs which derive their nervous supply from these sources lose their vigor.

In many respects, analagous to concussion of the nervous centres is what I shall term concussion of the nerves. A number of cases have come under my observation which I cannot otherwise explain than on the supposition that the nerve receives a shock, and the function is for the time suspended, whether from actual lesion of its tissue, or a disarrangement of its molecular structure I cannot decide, but in a manner similar to injuries of the great nervous centres, The progress and termination of these cases is peculiar, and tends strongly to confirm this view of their nature. The one striking and important feature of all is intolerance of over exertion. Moderate exercise seems beneficial, but when the limb is pressed into active service it has seldom failed to become speedily and decidedly worse. There seems from this circumstance to be a loss of the nervous power of the limb, or an impairment of the integrity of the nerves supplying it. The consequence of this condition is that the limb emaciates, the muscles are more or less atrophied, and the limb becomes permanently incapable of its former usefulness.

The following cases will give a clear idea of the symptoms, progress and results of this accident :

CASE I.—*Severe concussion of the leg by being thrown from a carriage; gradual loss of power with emaciation; aggravation of symptoms on exertion; improvement following rest, passive exercise and friction.*—Mr. T., of Honesdale, Pa., came under observation in December, 1849, suffering from injuries which he had received in the month of July preceding, from being thrown from a carriage. The accident occurred while attempting to curb his horse, which had taken fright and was running at the top of his speed. He was thrown clear from the vehicle, and alighted on the road upon his feet, but more heavily upon the right foot, and then full upon his left side. The only external evidences of injury were contusions on the external part of the left leg, and the left wrist and arm; these bruises were trifling and soon recovered from. His first impression was that the bones of the leg were broken, but on examination this proved not to be the case. On attempting to walk, the right leg was found paralyzed, and soon after it became so painful in the neighborhood of the knee joint as to cause faintness. The motion of a wagon produced the same extreme suffering, which subsided on resuming a quiet, horizontal position, and has never returned. After applying a tight bandage to the limb, he rode home, a distance of thirteen miles. On the second day the muscles below the knee were considerably swollen, and so sensitive to the touch, that bathing with the softest towel or sponge produced a sharp, thrilling sensation. The surface assumed a yellow appearance, and resembled the discoloration of an ordinary bruise from the knee to the ball of the great toe.

He was attended by Dr. S., an intelligent physician of that place, who judiciously advised rest and fomentations of wormwood, etc. The inflammation gradually subsided, and in the course of a week or more he was able to move about upon crutches, but without recovering the use of his limb. Blisters applied to the calf of the leg proved at first beneficial, but soon lost their effect. He resorted to a variety of stimulating liniments, and finally to the warm and cold douche, and from the latter derived more benefit than from any other application. Warm water had a debilitating effect. He continued the cold bath and friction until it became difficult to bring about reaction, when it was discontinued. He was now able to bear some weight upon the limb, and was directed to use it as much as possible; these efforts, however, had a decidedly injurious effect, and he soon lost the power of extending the leg, and even moving the parts below the knee. Without any assignable cause he again acquired the power of extending and raising the leg, and was able to walk about the house with the aid of a cane. There was this peculiarity still existing, that any pressure exercised upon the leg, as the edge of the seat, or even his staff lying across the thigh, gave the sensation of deep-seated pain. He was, therefore, always obliged to sit with the leg in a horizontal position. He again attempted to force his leg into use, by walking more, and without the aid of a crutch, but the result was still more unfavorable than the first trial, as he not only lost the power of extending the limb, but he never recovered it. Electricity was now used for several weeks, but with no advantage.

It was at this period, Dec., 1849, that he came to this city to obtain further medical advice. He consulted several surgeons, who gave various opinions as to the nature of his disease, and recommended the trial of other remedies, as issues, blisters, etc. He consulted me among the number. The limb was then atrophied, cool from languid circulation, and morbidly sensitive. In other respects, there was nothing worthy of note. On his return home, blisters were applied to parts of the leg, but without benefit; cold and warm shower baths were used with equally unsuccessful results. During the summer of 1850, he employed a strong decoction of oak bark, with brandy and camphor, with the effect to reduce the enlargement still existing above the knee. The leg seemed to the patient to become colder after use than before, at other times it seemed warmer, though its temperature was not increased. In Sept., 1850, he again called upon me. There was no marked change in the appearance of the limb, or in the patient's general condition. On returning home he bandaged the limb with adhesive plaster, and continued this treatment two or three months, avoiding all fatiguing exercise, but without benefit.

During the summer of 1851, he consulted several surgeons of Boston, who coincided in the opinion that the tendon of the quadriceps extensor had been severed. At the suggestion of one of them, a splint was fitted to the posterior part of the leg, so as to fix the limb in an extended position. By this means he was able to move the limb with greater ease than previously, but it did not enable him to walk as was anticipat[illegible] limb has gradually emaciated, and in August, 1852, the thigh [illegible] five inches smaller in circumference than the right, and othe[illegible] were correspondingly wasted. I have seen him occasionally since, but there has been no permanent improvement in his condition. He has spent some time at a Water Cure Establishment, where his general health was improved, and there was some amendment of the affected limb. He attends to his business, but is careful not to become fatigued in body or mind.

Case 2.—*Injury of the foot from wearing a tightly-fitting boot.—Recovery on going to Europe and giving the part rest.—Return of the disease on attempting a pedestrian tour.—Partial recovery after repose.—Relapse on striking the foot against a stone stair.—Permanent lameness with atrophy of the limb.*—T. S., æt. about 40, of general good health, has suffered for a long period from an obscure affection of the nerves of the foot and leg, consequent upon an injury received when quite a young man. It occurred from continued and severe pressure over the instep, induced, and kept up, by wearing a very tight boot; which finally set up an inflammation of the integument. After recovering from this attack, his foot and ankle remained weak, unable to endure much exercise, and intolerant of the pressure of a boot. After exertion it was also the seat of considerable pain, and a sense of weariness, but when allowed to rest always improved markedly. The only treatment resorted to was the application of a blister, which gave no relief.

Three years after, he visited Europe to complete his studies, and while at sea the foot seemed to entirely recover; he no longer suffered the peculiar weariness formerly experienced, and the pressure of a boot could be borne. On arriving at Paris, he began to wear a boot again, and walk and dance as freely as ever. He arranged a pedestrian tour of Europe, and at Lyons purchased a heavy pair of boots, which not fitting exactly, induced a return of his former sufferings. He soon recovered upon removing the the cause and taking rest.

The following winter was spent at Washington, where he resumed tight boots and his gay habits. Another relapse occurred, and the symptoms were more severe than before; the pain now extended to the leg, thigh, and hip, and even to the shoulder, hand, and fingers. He consulted many physicians and surgeons, and resorted to a great variety of treatment, without benefit. All local applications, as well as general treatment, of a stimulating or depressing nature, made him worse; but whatever improved his general health had a favorable influence upon his disease. Riding in the country in an open carriage proved decidedly beneficial.

Not improving to his satisfaction, in the following Spring he went to Europe to obtain further medical advice. He consulted Sir Astley Cooper and Brodie, but obtained no satisfactory opinion of the nature of his disease. Mr. Cooper advised emplastrum ammoniaci cum hydrargyro, which he applied on returning home. At the same time he walked but little, and again began to improve. The affected leg, thigh and nates had become cooler, somewhat atrophied, and exceedingly sensitive to changes of the weather. He could always walk with the least discomfort after a night's repose. If he walked one step too far, the pain returned, and continued to increase in severity until he again obtained rest. Being a gentleman of great intellectual activity, and fully occupied in the practice of law, if he overtaxed the brain, the pain would recur in the limb, and extend over the whole right side of the body.

He continued in this condition until 1841, when he again walked too far, and the old complaint returned with renewed severity. He now consulted a surgeon in Boston, who advised rest, dry frictions, and the occasional application of leeches. Rest and frictions were very beneficial, but the leeches always proved injurious. He improved rapidly under the former treatment, and gained a better state of health than he had enjoyed since his first attack. For the following eight years he continued quite comfortable, always avoiding over-exertion of both body and mind.

In 1849, while running up the door-steps, he unfortunately struck the top of his foot against the stone stair, and the whole difficulty again returned in an aggravated form. At this period he came under my own observation. The affected limb was now decidedly cooler than the other; the circulation feeble, and it was very sensitive to changes of the weather. I directed perfect rest, and, as a local application, tinctura iodinii. After this a blister was applied. In the meantime an abscess formed on the face, which was very painful and greatly prostrated him. He, however, convalesced slowly, and in the spring of 1850, again visited Europe. He there regained his general health, and his limb improved correspondingly. So sensitive is this leg to changes, that the air of different localities affected it differently. In Naples, for example, he was very comfortable, while at Rome he suffered from prostration.

The leg, at the present time, is far from being sound and healthy. It is, as formerly, intolerant to severe exertion, and probably never will recover a more healthy condition than at present.

CASE 3.—*Injury to the foot from the fall of a flat iron—Weakness of the limb and lameness resulting—Improvement after repose and aggravation of symptoms on taking exercise—Permanent lameness with emaciation of limb.*—Miss T., aged 26, of Westfield, Conn., of vigorous health and sound constitution, received an injury to the right foot from the fall of a flat iron in June, 1848. For several days the foot was very painful, but it gradually recovered by rest, so that she was able to walk without inconvenience. Soon after, she left home on a visit, and at first could walk some distance without difficulty, but on taking a long walk, up and down hill, the old pain returned, centreing chiefly, however, in the hip. The pain in the hip was located just behind the great trochanter, in the course of the ischiatic nerve. She was confined to the house, and walked but little around the room until September, when she was able to walk with considerable freedom. Still, she derived so much benefit from rest, that she did not venture to walk any distance until November. From this date she remained quite free from trouble until the following October, when the pain returned for a day or two, after taking a long walk.

She again remained free from pain until August, 1851, when she was attacked with cholera, and on recovering, experienced a return of her former pain. It subsided after two or three weeks, and she continued in good health until June 19, 1855, when she fell down several stairs, spraining the right ankle and receiving a shock to her whole system. Her hip again became the seat of pain from which she has never recovered. For two weeks she kept about the house with difficulty by using a cane, and went up stairs two or three times a day. She was then compelled to keep in her room, and for the most part in bed, for the space of three weeks. After this she was rolled out in a chair to meals, and occasionally rode out several miles. These excursions would sometimes be productive of relief to the pain in the limb, but more often she received no benefit. The position of the foot productive of the greatest relief was elevated, and she consequently seldom allowed it to rest upon the floor.

About the first of September following the injury she took to bed, sitting up only to take her meals, write, etc. She found by experience, however, that even this amount of exertion made her limb worse, and from November 7th to the 22d of January, 1855, when last under observation, she constantly maintained a reclining posture.

During the month of August, after keeping her bed about a fortnight, *she had improved so* much that she determined to attempt the use of her *limb again. She was, however,* made immediately worse, and did not soon recover her former comfortable state. She writes, "Anything that fatigues me, occasions a return of the old feeling; sometimes it seems like a pressure, or wearied state of the nerves; the word ache better expresses the feeling than pain. Some days reading, writing, and sewing do not apparently injure me; again, the affected limb quickly warns me to lay them aside. Reading fatigues me the most."

The pain in the hip is usually of a dull, aching character, that in the foot sharp and lacinating. For a few days after the fall in June, there was considerable tenderness in the course of the ischiatic nerve, and occasionally the pain has been succeeded by a soreness. For a long time there was throbbing in the hip, like "pulsations of the heart after running," as the patient describes it. There were spasms of the muscles of the limb, and a feeling as if the nerves were put upon the stretch. She also experienced a burning sensation in the foot, which was perceptibly warmer at one time than another. She had occasional intervals of pain, eight days being the longest period.

Her general health continued excellent, appetite good, and she grew fleshy. The local application which seemed most beneficial, was dry friction and bathing with spirits, and this was always agreeable and greatly relieved the pain.

CASE 4.—*Blow on the knee resulting in lameness and emaciation of leg.*— In the year 1845 I was consulted by Mr. G., of Connecticut, for weakness of one leg, the consequence of a blow upon the knee. In alighting from a carriage, he struck his knee so violently as nearly to induce faintness. He recovered from the shock after resting some time. Subsequently he overexerted the limb, and soon after began to experience a dull pain in the whole leg and through the body.

When he consulted me he walked with crutches, and the leg and thigh were emaciated, cool, and livid. The least exertion of the leg gave rise to dull pains and prostration of the general system. He could scarcely use the muscles of this limb, so much were they enfeebled by disease, and the loss of nervous power. If his mind was too much occupied, the pain recurred in the limb.

He had consulted many physicians and surgeons, and employed a great variety of remedies, but without deriving material benefit. I directed my treatment, as in the preceding cases, to the restoration of the impaired nerves, with similar results. Rest and dry friction proved by far the most efficient restoratives. I heard from him two or three years since, and learned that he had so far recovered as to be able to attend to his duties as a country merchant.

CASE 5.—*Lameness and atrophy of leg from the kick of a horse upon the thigh.*—In June, 1855, I was consulted by Mr. A., of Indiana, a man aged 45. He was a farmer by occupation, and had received a kick from a horse upon the external aspect of the middle part of the right thigh. The early history of this case was very similar to those already related. The leg and thigh, when examined, were much cooler than natural, and in an atrophied condition. He was able to exercise moderately, but when the limb was pressed into active service it became the seat of dull, aching pains, and led to general prostration.

He had been under the care of several physicians, and had resorted to almost every variety of treatment, both rational and empirical, but had received little or no benefit. For the last few months he had been using water, and from this treatment received more advantage than from any other remedy. His general health became established, and a corresponding improvement of his leg followed. He was, at the time of consulting me, using a wet towel.

This case was evidently one of the class which is the subject of thi paper, in which the nerves of the limb are impaired by a shock or concussion. I advised him to continue the use of water, to employ dry friction, take passive exercise in the open air, but never to use the limb up to the point of bringing on the dull, tired pain of which he complained so much. I urged upon him the necessity of strict adherence to the latter direction, as I regard a failure to attend rigidly to this advice, fatal to all hopes of recovery.

I have not learned the result of this case.

CASE 6.—*Paralysis of iris, caused by an injury of the supra-orbital nerve ; loss of vision.*—M. Y., aged 13, an exceedingly promising lad, while playing with schoolfellows, received a blow upon the forehead, from a small stone thrown by one of his mates. The particular point of injury was the supra-orbital branch of the fifth pair of nerves. The first symptoms were those of slight concussion, but the pupil became at once dilated, the iris was immovable, and the vision lost.

Several oculists were consulted before he was placed under my care. On investigating the case, considering the nature of the injury, and the condition of the eye immediately subsequent to the blow, I concluded that it was of the class of those described in this paper, viz., a severe concussion of the supra-orbital branch of the fifth pair, with permanent impairment of its function.

My treatment consisted in perfect rest of the eye, frictions to the forehead, and the application of the tincture of iodine, with careful attention to his general health. He continued his studies by having a second person read to him, and the moderate use of the uninjured eye. He gradually improved, the eye became nearly natural, the pupil moved sluggishly, but vision was never restored. He finally returned to his studies, and after continuing them for two years, he sailed for Europe. He has recently returned in good health, the eye being still deprived of vision.

In reviewing the foregoing cases, the following conclusions may be deduced in regard to the diagnosis, prognosis and treatment of concussion of the nerves :

Diagnosis.—It is of the utmost importance for the successful issue of this affection of the nerves, that the nature of the accident be clearly understood. The first effect of concussion of the nerves, as of the brain, is a sudden suspension of function. The part is temporarily paralyzed ; reaction soon comes on, with a gradual restoration of power. This may result in an inflammatory attack, and the early treatment should be directed to its prevention. When this period has passed, although the nerves of the part seem to have recovered their functions, they are really enfeebled and incapable of their former exertion. If the organ which they supply is subjected to severe exercise, it becomes the seat of a dull "aching or tired pain," the sure evidence of exhaustion. The latter is one of the most constant symptoms of this affection of the nerves, and deserves special attention. It will be observed that the injured limb is intolerant of severe exertion, and when exercise is carried beyond a given limit, nervous exhaustion follows, and nothing but rest, often long continued, will restore its previous comfortable condition.

Prognosis.—The prognosis in concussion of the nerves depends much upon the early treatment pursued. If the nature of the injury is properly recognized, and the means employed for the gradual restoration of the healthy tone of the concussed nerves be judiciously selected, entire recovery may be confidently anticipated. The history of the foregoing cases, especially numbers 2 and 3, would lead us to infer that after apparent recovery the nerves remain irritable, and liable, on the occurrence of an exciting cause, to a relapse. If, however, the condition of the nerves is not understood, and active, exhausting measures are resorted to, the prognosis is decidedly unfavorable. Aggravation of the symptoms promptly occurs, partial paralysis, and a gradual wasting of the limb follows, and its usefulness is permanently impaired. The weak and irritable condition of a part extends to the nervous centres, causing a general nervous irritability, and this in turn aggravates the local affection. In no instance has the disease resulted fatally to life.

Treatment.—The proper treatment of concussion of the great nervous centres, has long been well understood; rest, until the equilibrium of the circulation is restored, and such lesion as may exist is repaired, is the most positive and essential element in the treatment. It is, in fact, the *sine qua non*. If the concussed brain, or spinal nervous centre, is prematurely exerted, a morbid process is set up which, insidiously but surely, leads to a loss of its integrity. Of other means, which are but the adjuvants to *rest*, in the treatment of these cases, it is not necessary here to speak.

The proper treatment of concussion of the nerves, immediately after the accident, I regard as one of the utmost consequences for future success. Perfect recovery depends entirely upon the plan thus early pursued. As in concussion of the brain, so in concussion of the nerves, *rest* is an element of treatment, without which all other remedies will positively fail. A perusal of the foregoing cases will confirm this assertion. I am the more anxious to impress this fact upon the practitioner, because, without exception, active remedies were early employed in these cases, and the limb was forced into too active exercise, and always to its positive injury. This course has been pursued from a wrong understanding of the nature of the injury inflicted upon the nerves. It has been supposed that the function of the nerve was simply suspended, that its power was dormant, and it only required stimulation to restore its healthy action. For this purpose electricity has been used in addition to powerful local applications and exercise, but always with positive injury. Local depletion has been practiced, under the impression that the pain was due to local inflammation, and the result has been no less unsatisfactory.

On the contrary, I regard the affection as one of pure nervous debility, the nerves being enfeebled by the shock. To employ stimulants under such circumstances would be to goad an already exhausted beast, or to urge to exertion a person prostrated by disease, in the hopes of thereby increasing strength. The condition of the nerves of the limb is similar to that of the retina in the disease known as asthenopia, viz., one of true exhaustion.

By rest, in the treatment of concussion of the nerves, I do not mean an absolute state of quiet, but a certain degree of rest, alternating with such an amount of passive exercise as never causes the return of the "dull, tired pain," of which patients invariably complain, when the nerves approach the state of exhaustion. Passive exercise, as riding in an easy carriage, or on the water, not carried beyond this limit, proves decidedly beneficial, and should be encouraged.

Next to this degree of rest, or limited exercise, dry frictions of the limb have given the most relief. Friction may be made with the hand or a coarse cloth, and should be continued according to the feelings of the patient. The application of a wet towel has seemed to afford some relief, and may be resorted to; hydropathic treatment has not, however, afforded any other results than improvement of the general health.

The condition of the general system should be carefully attended to, for on its integrity depends the tone of the nervous system. This fact is illustrated in Case 3, where an attack of cholera severely aggravated the existing affection of the nerves of the leg. While all fatiguing exercise of the body, within the limits specified, should be scrupulously avoided, it is not less important that the mind be not overtasked by exertion or anxiety.

In Case 2, the patient, a lawyer, could never apply himself to business without an aggravation of his symptoms, attended with general prostration; and, in Case 3, reading and writing proved equally injurious, exciting dull pain in the limb.

In conclusion, the following propositions may be stated:

The first effect of concussion of the nerves is temporary paralysis, more or less complete, of the limb; the second effect is an enfeebled condition of the nerves leading to deficient innervation, emaciation of the limb, and permanent paralysis.

The proper treatment is rest, alternating with passive exercise, dry friction, and improvement of the general health.—WILLARD PARKER.

NERVES, Congestion of.—*Definition.*—The primary condition of neuritis and probably the condition present in many cases of pain in nerves, which usually passes for neuralgia.

Causes.—The causes of neural congestion have not been determined, except that the condition has been produced artificially by some observers, by congelation of a nerve trunk by intense cold.

Symptoms.—The symptoms recorded from the condition as artificially produced are, intense aching pain along the course and distribution of the nerve experimented upon, succeeded by numbness, loss of sensibility, gradual loss of motility, and rise of temperature. As thawing takes place it is accompanied by a sense of soreness of the nerve, lasting from ten to fourteen days after the condition induced; vertigo may occur also, and numbness, pricking, and partial loss of power.—WILLIAM A. HAMMOND.

NERVES, Inflammation of.—(1) Acute, (2) chronic. Acute neuritis is uncommon, and is marked by continuous pain, tenderness, and swelling along the course of the affected nerve, and often by spasms of the muscles connected with it.

CHRONIC NEURITIS.—*Causes.*—Exposure to cold and damp: the same causes combined with injury, injury alone, excessive fatigue, rheumatic constitution. *Symptoms.*—Sometimes like those of acute neuritis, but milder and more persistent. After death the nerve is found swollen, injected, and occasionally suppurating. *Treatment.* General and local antiphlogistics; rest; position of relaxation; leeching; purgation; iodide of potassium. Specific remedies when rheumatism, gout, or syphilis is diagnosed.—C. B. KEETLEY.

NERVES. Tumors of—*See Tumors, Neuroma.*

NETTLE RASH—*See Urticaria.*

NEURALGIA.—*Natural History.*—Excruciating pain, which is paroxysmal, and returns with renewed violence in a part after periods of temporary remission, constitutes neuralgia.

All neuralgias are symptomatic either of an organic lesion, of which the neuralgic pain is a reflex expression, or the pain is due to a direct organic lesion, involving, compressing, or otherwise irritating various branches of nerves, and so giving rise to pain. In some cases neuralgia is symptomatic of various cachexias—*e. g.*, chlorosis, lead-poisoning, anæmia, malaria, rheumatism, syphilis; or it is a reflex induction from an acute inflammation, as from a carious tooth, a necrosed bone, a tumor, or a phlegmon.

The principal varieties of neuralgia are—(a.) Facial neuralgia, tic douloureux, or neuralgia of the trigeminus; (b.) Brow ague, hemicrania, or migraine; (c.) Sciatica, or hip-gout; (d.) Intercostal neuralgia. But in addition to these there may be mentioned—(e.) Crural neuralgia; (f.) Lumbo-abdominal neuralgia; (g.) Cervico-occipital neuralgia; (h.) Cervico-brachial neuralgia; (i.) Mastodynia, or irritable breast.

Two forms of pain are to be distinguished, namely, one continuous, increased by pressure, confined to circumscribed spots or points in the course of the nerve—usually not a very severe pain, but a very annoying and persistent source of irritation; another form of pain occurs in paroxysms, spreading from a point along the course of a nerve upwards and sometimes downwards from a point, and is deep-seated rather than superficial. This kind of pain is terrible, and almost unbearable.

(*a.*) In Facial neuralgia the branches of the trifacial nerve may be attacked separately or conjointly; most commonly, however, only one branch is affected, less frequently two; and the case must be severe in which the three branches, or the whole side of the face, are affected. Nevertheless, it sometimes so happens, extending even over the summit of the head, and over the temporal region, by the deep branch of the fifth pair, which emerges to the surface anterior to the external meatus. It is sometimes also associated with a similar affection of the occipital branches at the same time. Next to the sciatic nerve, no nerve is so often the seat of pain as the trigeminus—a greater liability to neuralgia arising from two circumstances, namely—(*a.*) The passage of its branches through narrow canal-openings in bones, where they are readily compressed; and (*b.*) from the distributions of the nerve over a large cutaneous surface, more exposed to cold and to changes of weather than any other part of the body. There are especially three points of pain in facial neuralgia, namely, the supra-orbital foramen; the anterior opening of the suborbital canal; and the mental foramen. These points lie nearly in a vertical straight line. If the neuralgia be limited to the first branch of the fifth pair, the pain spreads in the branches of the supra-orbital, affecting especially the forehead, eyebrows, and upper eyelids, occasionally the eye itself. After this threatening symptom has lasted a few hours or a few days, the patient is seized with a violent darting or shooting pain in the course of the nerve, returning at intervals—phenomena which are characteristic of the disease. The paroxysm is short, lasting only a few seconds or a few minutes; but the pain is perhaps the most severe that the human frame is capable of suffering. Sudden changes of weather are exciting causes of neuralgia.

When the branches, generally of the fifth cranial nerve, are affected, the most painful points are at the exit of the ophthalmic, of the superior and of the inferior maxillary branches. Next to those the frontal, and next the parietal, and lastly the occipital, although its origin is independent of that of the trigeminal; and whether the trigeminal is affected by itself, or the occipital nerve as well, pressure made on the spinous processes of the first two cervical vertebræ always causes shooting pains in the diseased nerves.

(*b.*) Brow ague, hemicrania, or migraine, is a combination of neuralgic symptoms with headache, occurring in paroxysms, and limited to one side of the head and brow. It is apt to commence in childhood and go on to advanced age, occurring in both sexes, but more often in women than in men. In women the attacks are common just before the menstrual period, or during its course. In other cases mental excitement has to do with the attack. The headache is probably due to excitement of the sensory filaments from the trigeminus to the dura mater, or to the sympathetic filaments accompanying the vessels. It increases rapidly soon after waking in the morning, with chilliness, loss of appetite, sliminess of mouth, sickness of stomach, nausea, and vomiting—sometimes of a bitter, greenish fluid, and at last the headache is so intense as to be almost unbearable. The eyes are extremely sensitive to light, and the ears to sound; so that the darkest rooms and most retired are anxiously sought for, and absolute seclusion is desired. The pulse is usually abnormally slow. Genera no relief is obtained till after a night of sound sleep, the patient awaking next morning free from pain but much depressed and exhausted. In women it frequently occurs in connection with the menstrual period, or with the commencement of pregnancy, and its tendency is to diminish after middle age.

(*c.*) Sciatica is a neuralgic affection of the sensory nerves of the sciatic plexus, composed of the fourth and fifth lumbar and first and second sacral nerves. It is often associated with rheumatism—so often that rheumatism is really the most frequent cause of sciatica, with gout, so as to constitute a special form of these diseases—namely, rheumatism of the hip-joint, or hip-gout. Catching cold is also a frequent cause. The pain may result from carious vertebræ, or tumor, or vascular increase, with varicose dilatations of vessels in the intervertebral foramina, through which the nerves pass. The presence of enlarged glands in the pelvis or of pelvic tumors, especially ovarian cysts, fæcal masses in sigmoid flexure of the colon, may also be sources of sciatic neuralgia. The disease is most frequent between twenty and sixty years of age, and is more common in males and those most exposed to changes of temperature, than in females and those who are living in ease and comfort.

The most frequent seats of pain are along the posterior cutaneous nerve of the thigh, where the posterior and outer part of the skin of the leg becomes painful; the superficial branch of the fibular nerve, where the pain is over the outer and anterior surface of the leg and the dorsum of the foot; the communicans tibialis, where the pain is in the outer side of the ankle and the foot. The most frequent points of pain are behind the trochanters, some parts of the thigh, about the knee-joint, just below the head of the fibula, just above the outer ankle, the ankle-joint generally, and the dorsum of the foot.

The disease rarely begins suddenly, but develops itself gradually, and slowly becomes severe. The pain is constantly growing and deeply seated, especially near the ischiatic tuberosity. Tension of the fascia usually makes the pain worse, and the leg is generally flexed, both while in bed or out of it, and from not using the limb, in chronic cases it may sensibly diminish in bulk. Effusion may take place within the sheath of the nerve, It is indicated by a dull, aching, benumbing pain, and a swollen sensation of the limb, succeeding intense pain, cramps, starting, and inability to use the limb. Usually sciatica is an obstinate disease, lasting for months or even years, and liable to relapse.

(*d.*) Intercostal neuralgia depends on the morbid excitement of one or several spinal nerves (sixth to the ninth), especially those which pass along the upper intercostal spaces towards the sternum, and along the lower spaces to the epigastrium. It is very common, and is met with more frequently in women than in men, especially in the sixth, seventh, and eighth intercostal nerves, and more common on the left than on the right side. It is not unusual after recovery from pleurisy, and may also accompany pulmonary tubercles. It is usually also associated with hysteria and anæmia, especially in women weakened by hæmorrhagia or leucorrhœa. The following points are commonly most painful, namely—The posterior part of the intercostal space somewhat outward from the spinous process, and on the level of the point of exit of the nerve from the intervertebral foramen. The point lying in the middle of the intercostal space, corresponding to the point of division of the intercostal nerve, and from which the nerves pass to the skin. A third point is near the sternum, between the costal cartilages in the upper intercostal nerves; in the lower ones it is in the epigastric region, somewhat outwards from the middle line. These points are generally very sensitive to pressure (hyperæsthesia). Hard pressure sometimes relieves the pain. An attack of intercostal neuralgia sometimes just precedes an eruption of herpes zoster or shingles; and in the intervals of the sharper pangs of pain, numbness, coolness, and formication are occasionally felt.

(*e.*) Crural neuralgia occurs where the sensory filaments of the lumbar plexus going to the thigh and leg are affected. The pain is felt along the anterior and inner surface of the thigh, leg, ankle, and dorsum of the foot, and in the great and second toes. It thus differs from sciatica, which is generally along the outer and posterior surface. It may be due to rectal irritation.

(*f.*) Lumbo-abdominal neuralgia affects the cutaneous nerves of the lumbar plexus, going to the lower part of the back, the nates, the anterior abdominal wall, and the genitals. The seats of pain are—to the outside of first lumbar vertebra, just above the middle of the crest of the ilium; to the inner side of the anterior superior spine, and the termination of the nerves towards the nates and the genitals generally in the mons veneris, vulva, or scrotum.

(*g.*) Cervico-occipital neuralgia arises from excitement of the sensory nerves, originating from the first four cervical nerves, affects the occiput, neck, and nape of neck.

(*h.*) Cervico-brachial neuralgia is located among the sensory twigs of the brachial plexus, composed of the lower four cervical and the first dorsal nerves. When the nerves of the brachial plexus are affected, pressure made over the spinous processes of the lower cervical vertebræ gives pain; so also in cases of intercostal, lumbar, or sciatic neuralgia, pressure over corresponding regions produces pain. Thus neuralgia reveals itself by acute pain which corresponds to the origin or point of exit of the implicated nerves, and the pain pretty frequently extends a little farther up along the vertebral column.

(*i.*) Mastodynia, or "irritable breast," is a neuralgia of the intercostal nerves, or anterior supraclavicular nerves, going to the mammary gland. It affects women about the period of puberty, up to the thirtieth year of life. The gland is sensitive to the slightest touch at one or more points; and severe pain occasionally shoots out towards the shoulder, axilla, or hips, and is worse shortly before the menstrual period. At the height of the pain vomiting may occur. The disease causes great anxiety, besides pain; for the patients generally dread a "cancer of the breast," especially if neuromata form in the gland. This form of neuralgia may last for months or years without any perceptible change or improvement.

In all these varieties of neuralgia there are certain characteristic symptoms, "especially (*a.*) cutaneous hyperæsthesia at the points of exit of the nerve-trunks. More rarely the reverse of this condition supervenes—namely, anæsthesia. It is most apt to attend neuralgia apparently of a rheumatic origin, or which is due to a slight lesion of the cord. In such cases, when the hyperæsthesia has lasted a long time, it is followed by anæsthesia, and sometimes by paralysis. In herpes zoster this is apt to occur; also in sciatic neuralgia. (*b.*) Certain superficial tender spots are also characteristic of neuralgia.

The particular form of cachexia has also a remarkable influence on the seat of neuralgia. In chlorosis, neuralgia is apt to affect several regions, but notably the trigeminal nerves and nerves of the solar plexus. In cases of anæmia from uterine hæmorrhages or leucorrhœa, the neuralgia is mainly gastric and intestinal. In malaria, the supra-orbital branch of the trigeminus is mostly implicated. In rheumatic cachexia it is generally the occipital and sciatic nerves; and neuralgias of rheumatic origin are generally multiple in their manifestation, and frequently alternate with articular pains.

Treatment.—Opiates, chloroform and chloral, are unquestionably serviceable in mitigating the sufferings of the patient. Belladonna, both internally and as a plaster, also sometimes relieves the pain. Stramonium and opium have a similar temporary effect. Belladonna and perhaps stramonium, are better than opium as a habitual remedy, and they appear to have done good occasionally. In facial neuralgia (not of rheumatic origin) no remedy does so much good as croton-chloral, in doses of three grains every two, three, or four hours. Chlorodyne is also to be recommended, the composition of which has been determined by the Pharmaceutical Society. The remedies of most value during paroxysms are the diffusible stimulants, such as sol volatile, hot tea, quinine in a full dose, alcohol in small doses, blistering and ammoniacal fluids to the skin immediately over the painful nerves, and the endermic application of a fifth of a grain of morphia. These remedies increase the supply of blood to the painful nerve, and, *pro tanto*, heighten its vital energy. The most speedy way of obtaining a temporary relief is certainly the application of a local stimulant, and more especially of some volatile agent, such as mustard, or, still better, chloroform diluted with seven parts of some simple liniment, such as belladonna. A rapidly acting blistering fluid is still more effective. But the more profoundly the general health has been affected, and especially the greater the degree of anæmia, the more necessary is it to join with the use of stimulants (both local, such as above mentioned, and general, such as the carbonate and muriate of ammonia, taken in five and ten grain doses respectively), a treatment directed to improve the condition of the blood by "food tonics," such as cod-liver oil, arsenic, or steel, or a combination of some of them, joined with the use of local stimulation, by means of frictions with dilute chloroform, and the manipulations of the scientific "shampooer." The hypophosphite of soda is of use, the phosphorus of this salt acting directly as a food to the nervous tissue. The subcutaneous injection of small doses (⅙ to ¼ of a grain) of morphia in solution will give temporary relief, and is especially useful to those patients who are obliged to go through an ordinary day of labor.

Another most efficient local application is the alkaloid aconitina, rubbed upon the pained part in the form of an ointment in the proportion of one or two grains to one drachm of lard. Morphia similarly used, and blisters, have also often exercised a beneficial effect upon the disease. Holding the head over steam, and the warm bath, are equally or even more beneficial in cases of facial neuralgia. When the neuralgia is superficial, compresses steeped in a solution of atropia have a good effect.

Where the causes of neuralgia cannot be removed, modes of treatment which greatly modify the change of tissue and the nutrition of parts are often beneficial. Chief among these is the use of electricity in the form of Faradization, using the electric brush; so that while one electrode, containing a moistened sponge, is held in one of the patient's hands, or against any part of his body, we stroke the brush along the course of the affected nerve; if there are any points very painful, allow the brush to remain over them rather longer.

The best treatment during attacks of hemicrania is total abstinence, except perhaps from fluids, to go to bed at once, and refrain from the use of any remedies. When the paroxysm is over, ferruginous or arsenical tonics are required.

The treatment of sciatica consists in the removal of the causes and circumstances already noticed as producing the disease. In the rheumatic form, the warm baths are most useful, especially the systematic treatment at Neuenahr, Wildbad, Wiesbaden, Teplitz and Bath. Iodide of potassium, in large doses, and sulphur, with guaiacum, appear to do most good. Of other specific remedies the induced, and still more, the constant current of electricity rarely fails to do good. Oil of turpentine, as an electuary, in the following formula—℞. Ol. Terebinth. ʒ i.; Mell. ℥ i., of which a tablespoonful is to be taken twice a day, is also very highly spoken of. Fowler's solution of arsenic and other tonics are required

In cases of mastodynia, or "irritable breast," soap plaster, with extract of belladonna, worn on the breast, may soothe the pain and prevent the gland being touched by the patient, as well as give support to the breast. The following pills are also to be taken: ℞. Ext. conii, ext. papaver, a a gr. ii., ext. stramonii, gr. ¼ to ½.—WILLIAM AITKEN.

NEURASTHENIA—*See Fear, Morbid.*

NEUROMA—*See Tumors.*

NEURITIS—*See Nerves, Inflammation of.*

NIPPLE, Cracked.—*Definition.*—Cracks or fissures on the nipple, sequela of excoriations; they may extend so as almost to cause the nipple to be lost.

Causes.—Too frequent suckling; saliva of infant, thrush.

Symptoms.—Severe pain on attempt at suckling, accompanied often with bleeding.

Signs.—Fissures more or less deep, from one-twenty-fourth to halt an inch in length; at first irregular, then smooth, with exudation of serum.

Diagnosis.—From above symptoms and signs.

Prognosis.—Often tedious.

Treatment.—The nipple should never be put away wet with the infant's saliva, but be carefully washed and dried. If nursing is to be maintained it should be through a protecting shield. Lotions of Goulard water, borax in powder, solution nitrate of silver, grs. 30 to the ounce, or, which is often sufficient, one or two applications of the solid nitrate of silver; collodion. If all measures fail, nursing must be given up.—HEYWOOD SMITH.

NIPPLE, Depressed.—*Definition.*—The nipple scarcely elevated above the level of the mamma.

Causes.—Congenital (?), pressure from stays.

Signs.—The nipple does not become erectile, and cannot be seized by the child.

Prognosis.—Intractable.

Treatment.—Friction of the nipple, astringent lotions ; the nipple should be drawn out into an exhausted breast-pump, and retained in that position for half an hour or longer at a time.

NIPPLE, Inflammation of.—*Definition.*—Inflammation, rare, either at the tip of the nipple in connection with the lactiferous tubes, or inflammation terminating in suppuration of the areola.

Causes.—Dirt, or other obstruction of the lactiferous tubes ; in the second variety, convection from the former, chill, or bruising by the child's mouth.

Symptoms.—Pain of a throbbing nature, swelling and great tenderness, rendering suckling impossible, or dangerous to the child from the risk of its imbibing pus.

Signs.—Small swellings containing pus at the tip of the nipple ; the formation of a nodule in the areola.

Diagnosis.—Easy from the above symptoms and signs.

Prognosis.—Favorable.

Treatment.—Poultices ; and when pus is evident, its free evacuation.—HEYWOOD SMITH.

NOMA—See Cancrum Oris.—Disease attacks external genitals of female children as well as mouth.

NOSE, Diseases of.—Those which require special notice are acute rosacea, lipoma, lupus, epithelioma, chronic nasal catarrh, ozæna, syphilis, tumors (including polypi), and deformities.

Acne Rosacea.—Vide Acne.

Nose, Lipoma of.—Integumentary and subcutaneous hypertrophy of alæ and tip of nose. Variable in extent and size. Attacks old men. Fibro-cellular and not fatty in structure. *Treatment.*—Removable by suitable incisions. Slight danger of erysipelas.

Nose, Lupus of.—Vide Lupus.

Nose, Epithelioma of.—See Cancer.

Nasal Catarrh, Chronic.—*Causes.*—Residence in damp, cold localities, repeated acute catarrhs, constitutional predisposition, struma, exposure to draughts, irritating dust, irritation of nasal polypi (and specific causes—see "Ozæna"). *Signs.*—Mucous membrane swollen, red, covered with secretion, mucous or muco-purulent, moist, or crusted. Sometimes a nasal tone of voice. Nose may be occluded by swelling of mucous membrane. Pharynx usually also affected. *Treatment.*—Treat the cause. Nasal douche with solutions of chlorate of potash, common salt, phosphate of soda, and carbonate of soda, in hot water (hot water is preferable to lukewarm). Use douche twice a day. Solutions should be just strong enough to taste saline. Later on, astringents should be added in small quantities to the saline washes. Nose not to be blown for a short time after douching. The same fluids may be applied with an atomizer instead of the douche. Inhalation of vapor of chloride of ammonium. Insufflation of powdered alum, bismuth, and starch, &c. Iodoform powder sniffed up. Iodoform in vaseline (gr. xx-℥ j); applied with a small brush far up each nostril. (Lennox Browne and Brandeis). With regard to the douche, it should be noted that Professor Roosa of New York strongly condemns it as too dangerous to the ears; and even Professor Cassels, who stoutly defends it, never trusts patient to use it himself. Sleep with a high pillow. Moderate diet. Fish and milk. Avoid stimulants. Cod-liver oil at night sometimes beneficial. Change of air and scene. Dry, elevated regions. Internally large doses of chlorate of potash.

Ozæna.—An habitual and offensive odor from the nose, often amounting to a horrid stench, and almost always of a certain characteristic nature. *Causes.*—(1) Strumous ulceration, (2) syphilitic ulceration, (3) necrosis from non-specific causes, (4) long-continued chronic catarrh, (5) foreign bodies impacted, (6) merely a peculiar tendency to decomposition of the nasal secretion. *Seat of Disease.*—Any part of nasal walls, or of sinuses opening into nose. Amount of discharge very variable. Often all passes backwards into pharynx. *Prognosis.*—Unless cause can be detected and easily removed, ozæna is very difficult to cure. May last for years. When complicated with bone-disease, deformity a frequent result. *Treatment.*—Antisyphilitics for syphilis. Cod-liver oil, iron, arsenic, &c., for struma. Explore nasal cavity carefully with a strong light, a mirror, and speculum. Remove dead bone. Nasal douche with hot alkaline or salino-astringent solutions. (See Nasal Catarrh). Solution of Condy's fluid. Insufflation of mercurial powders—white or red precipitate, 2 grains to 1 drachm of sugar. Iodoform. (See Nasal Catarrh). Pugin Thornton strongly recommends spray of solution of borate and carbonate of soda.* In syphilitic ozæna of infants, syringe out nostrils with hot saline solutions, and afterwards insert melted ung. hyd. nitrat. dil., or iodoform ointment. Of course remove foreign bodies. Treatment of ozæna must be persevering, and used twice, or even three times a day.

Nose, Tumors of, are either (1) "mucous polypi," (2) "fibrous polypi," (3) malignant, (4) cartilaginous or (5) osseous. The first three are the

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*℞ Sodæ carbo., sodæ biborat, aa ʒ ij; liq. sodæ chlorinatæ ʒ ss-℥ ij; glycerini, ℥ j; *aq. ad ℥ viij.*

most common, especially the first. *Causes.*—As obscure as those of tumors elsewhere ; but mucous polypi sometimes appear to rise from long-existing chronic catarrh. *Symptoms and Diagnosis.*—Those of nasal or naso-pharyngeal obstruction, often combined with nasal catarrh and leading to deformity of the face. Mucous polypi may usually be seen and recognized by their pale, semi-transparent appearance and soft consistence. Fibrous polypi cause hæmorrhages, are red and firm, are usually single, and are attached to the roof of the non-pharyngeal cavity. Malignant tumors grow rapidly, bleed, fungate, infiltrate neighboring parts, cause pain (often considerable) and cachexia. Cartilaginous and osseous tumors are rare, and may be known by their consistence. Very rarely certain extraordinary loose osseous tumors are found in the nose or the adjoining sinuses. *Pathology.*—Mucous polypi are fibro-cellular tumors, or myxomata, or fibromyxoma. Fibrous polypi are fibro-sarcomata or pure sarcomata. Mucous polypi are usually attached to the other side of the nasal cavity, especially to the middle turbinated bone. Fibrous polypi spring from the periosteum. They are usually attached towards the back of the roof of the nose. See Cancer, for the structure of cancerous tumors. *Treatment.*—Twist and tear out mucous polypi with polypus forceps. Ordinary dressing forceps do not usually bite well enough. Afterwards, to prevent or delay recurrence, prescribe tannin as snuff, or else spray of solution of sulphurous acid. A. sulphurosi (P.B.) j—aquæ iij. Polypus snare. Naso-pharyngeal polypi. Fibrous polypi, if they cannot be snared, may require operations even of the first magnitude, *e.g.*, removal of superior maxillary bone. Other procedures involve cutting through hard and soft palate, or slitting up nose close to middle line, or Langenbeck's operation, which resembles excision of upper jaw, only that bone, after being turned out, is replaced. Cancer requires excising like fibrous polypus, unless too far advanced.

Abscess is an occasional cause of swelling in the nose, especially during syphilitic disease. Open early.

Nose, Deformities of.—Congenital are very rare. Flattening from syphilis or from accident is difficult to treat, especially the former. To raise a nose depressed by fracture instruments such as those of S. Gamgee may prove useful.—C. B. Keetley.

NYCTALOPIA.—The faculty of seeing during the night with privation of the faculty during the day. It affects both eyes at once, when idiopathic. Its duration is uncertain and treatment very obscure. It is, however, a disease of nervous irritability, and one of excitement of the visual nerve in particular. The indications of cure will consequently be —to allay direct irritation in every way ; to excite counter-irritation by blisters ; and to gradually accustom the eye to the impression of light.—Dunglison.

NYMPHOMANIA.—*Definition.*—Craving for sexual intercourse.

Causes.—Some brain diseases, hypertrophy (effect ?) of clitoris or nymphæ, ovarian irritation, masturbation.

Prognosis.—Unfavorable.

Treatment.—Cold sitz bath, leeches to uterus, perineum, or inside of thighs ; large doses of bromide of potassium, camphor, conium, tartarized antimony, ipecacuanha ; blisters to clitoris and nymphæ ; chloral, avoidance of alcohol and high living, outdoor exercise, healthy occupation of the mind, sedative pessaries ; removal of nymphæ or clitoris.—Heywood Smith.

ŒDEMA GLOTTIDIS—*See Larynx, Diseases of.*

ŒSOPHAGISMUS, or Spasmodic Contraction of the Œsophagus.—*Frequency and Causes.*—If we accept the opinions of most of those who have written on this affection, we would be led to the conclusion that it was much less rare than a more careful examination proves. Most authors, especially the earlier ones, have included, in their descriptions, cases in which the œsophageal spasm was merely an accessory phenomenon to some other disease, such, for example, as tetanus, hydrophobia, or hysteria. If we restrict the term œsophagismus to those cases in which there is no discoverable lesion present, or in which it is not merely the symptom or result of some other affection, in other words where it is idiopathic, we shall find that most of the cases quoted will have to be excluded. This would leave but very few true cases on record, and it must therefore be considered as one of the rarest affections met with.

Valleix[*] defines the condition as a "convulsive constriction of the œsophagus whose explanation can not be found in any organic lesion of that or the neighboring organs." This is perhaps the best definition yet proposed.

Von Ziemssen[†] says: "The so-called idiopathic spasm includes all those cases in which no definite anatomical cause can be demonstrated. If this idiopathic spasm is admitted to be a true neurosis of the œosphagus, it will be necessary to include under this form all those cases which result from reflex action, and from irritation of the terminal branches of the vagus nerve, external to the œsophagus, as well as irritation of other centripetal nerves." In all cases coming under this definition, the patient must be the subject of some neurosis, the exact nature of which, however, may not be demonstrable.

Age and Sex.—As many of the causes are most frequently seen in the female sex and in adult age, we naturally find that the disease is most often met with in women, and after the age of puberty. All authorities are agreed on this point, though Everard Home and Dr. Stevenson have cited cases that have occurred during the first years of life. It is to be supposed, however, that these cases were nothing more than simple spasm of the glottis, or ordinary dysphagia.

Duration of the Attack.—It is generally conceded that the attack is variable in its duration, sometimes lasting but a few moments, at others continuing for days. With very few exceptions it is remittent in character, the patient being able, at intervals, to swallow enough nourishment to preclude the possibility of death by inanition. In none of the recorded cases has the closure of the œsophagus been so absolute and unremittent as in one recently seen by me, in which death by starvation and uræmia was imminent.

Von Ziemssen,[‡] in his excellent article, observes on this point: "The duration of a single attack varies considerably; it may continue for minutes, hours, days; indeed, the spasm has been known to persist for weeks and months. This '*stenosis spastica fixa, continua*' of Hamberger runs its course without pain, and shows fluctuations of intensity, without at any time complete disappearance of the spasm. In this rare form, even though the ability to swallow has never been abolished, deglutition suffers, and with it, very perceptibly, the nutrition of the patient."

Anatomical Lesions.—In those cases where an autopsy has been held, as in those reported by Rutherford, Monro and Power, no anatomical lesion has been found. (We, of course, exclude such cases in which there was ulceration of the œsophagus where the spasm was secondary).

Diagnosis.—The question of diagnosis becomes only of real importance where the disease is primary, for where it is a symptom of hysteria or tetanus, the recognition of its cause becomes a comparatively easy matter. The diagnosis of the idiopathic form can only be arrived at by a careful process of exclusion. Organic strictures arising from aneurismal, cancerous or other tumors must be negatived by careful physical examination, and consideration of the previous history. The suddenness of the attack, oftentimes making its first appearance during a meal, is a point that would lead us to suspect its nature. The passage of an œsophageal bougie would be the best means to determine the nature of the constriction. In passing the sound a resistance will be met with in both cases, but if the stricture be spasmodic, the obstruction will yield to its mere presence in a short time, whereas, if the constriction be an organic one, the passage of the instrument becomes more difficult and painful, and the same resistance is met with during its withdrawal.

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[*] Valleix. Guide du Medecine Practicien. 5th edition tom. III. p. 584.

[†] Von Ziemssen. Cyclopædia of the Practice of Medicine Am. Ed. Vol. VIII. p. 206.

[‡] Von Ziemssen, op. cit., p. 208.

Prognosis.—In cases where the diagnosis is clearly determined, the prognosis is by no means unfavorable, although Henry Power and others have cited cases where the disease terminated fatally, in which no anatomical lesions were found on the autopsy.

Treatment.—The method of treating the affection will, of course, depend greatly upon the cause of the trouble. In those cases where it is only an accessory phenomenon, it does not call for special measures for its relief, subsiding when the original disease is under control. In such cases there is ordinarily nothing to be feared from inanition caused by the inability to swallow, or if there be, the symptoms of the primary affection are those that require most attention.

It is, however, the protracted idiopathic form that occupies us at present. Medicinal agents of many kinds have been used, sometimes with success, and sometimes fruitlessly. As, in these cases, the spasm arises from a reflex origin, it would seem *a priori* that the employment of such remedies as tend to allay reflex excitability, would offer the greatest hope of success. Dry cups to the spine, camphor, musk, belladonna and bromide of potassium have been nsed with some advantage. The latter medicines might be given by the rectum, when they cannot be introduced into the stomach, or it would perhaps be still better to administer atropia or morphia hypodermically.

Strychnia and electricity have been recommended and some authorities have reported cases in which these methods were successful. Both of these remedies tend to increase reflex excitability, and it is difficult to understand how they can cut short an affection which takes its origin from the very effect that they produce. The only explanation that can be offered is that these cases were not spasmodic constriction but rather paralysis of the œsophagus and the diagnosis was a mistaken one. In the case above mentioned, the spasm supervened immediately after an electric bath, and might not the increased reflex excitability induced thereby have been the exciting cause of the affection ?

In many cases, all these measures will fail to afford relief. We must then have recourse to the œsophageal sound. A large size should be chosen, as it will probably accomplish its object better than a small one. The reason for this is the same for which we usually select a urethral sound of large circumference, when we wish to overcome the obstruction produced by spasm. in the urethra. We frequently find that spasmodic urethral strictures will admit an instrument of considerable size, when they will not allow the introduction of a filiform. The cause of the stricture is in all probability identical in the two cases, a spasmodic contraction of the muscles surrounding the tube.

When the sound is introduced, the obstruction will probably seem to become more resistant. The instrument should then be held against the resisting point with gentle yet firm pressure, and in a few moments the spasm will give way and the sound pass of itself without further opposition.

A single introduction of the bougie in this manner will often suffice, for a complete and permanent cure. If the affection should return, a subsequent introduction becomes an easy matter.

The question arises: Is it worth while in a case of this nature to try medicinal remedial agents first? For my own part I think it best to proceed at once to the mechanical method of cure. An early introduction of the sound is sometimes an indispensible method of diagnosis, and at the same time that it glves us the necessary information concerning the disease, it likewise acts as a radical means of cure.—J. J. HENNA.

ŒSOPHAGITIS.—*Natural History.*—Inflammation of the œsophagus is a rare disease. Morbid poisons seem to have little influence over this portion of the alimentary canal. The most frequent causes of its inflammation are, accidentally drinking boiling water; swallowing corrosive liquids, such as the mineral acids; and wounds, most commonly inflicted in the act of committing suicide. Children a few days old are sometimes affected with slight inflammatory affections of the œsophagus. In new-born children points of lymph may be found lying on the mucous membrane of the œsophagus, and apparently an extension of thrush affecting the mouth and pharynx. Ulcers in general form on the anterior portion of the œsophagus; and by continued extension they at last penetrate the posterior surface of the larynx, so that the patient may die suffocated from the escape of food into the lungs. Occasionally the ulceration takes place from without inwards. The cicatrices or the careless use of a proband are apt to induce stricture. The symptoms of œsophagitis are almost entirely local, and consist principally of pain, dysphagia, the expectoration of a thick viscid mucus, and vomiting. Emaciation follows the loss of nutrition, and the patient ultimately dies from inanition. Auscultation of the œsophagus, along the left edge of the vertebral column, may help to detect the site of disease.

The *treatment* of œsophagitis is by small local bleedings, warm cataplasms to the neck, and by moderately acting on the bowels. When the case is hopeless, from the small quantity of aliment which reaches the stomach, life may yet be prolonged by enemata of soups, milk, egg, wine, or other nutritious fluid matters, and œsophagotomy may be necessary.—WILLIAM AITKEN.

ŒSOPHAGUS, Foreign Bodies in.—May lodge in any part, but usually stop at commencement just behind cricoid cartilage.

Symptoms.—Local pain, especially on attempting to swallow. The character of the pain and the presence or absence of dyspnœa depend on the nature and size of the body. So also do the prognosis and treatment. A soft, soluble, or macerable substance may pass eventually with little or no external assistance, or may easily slip down before a probang. A pin may be caught by the horse-hair probang, and a coin by the "coin-probang;" or either may be brought up by forceps, such as those of Bryant. But large jagged bodies may demand a cutting operation; and, when they cannot be recovered by less serious means, œsophagotomy had better not be delayed. Urgent dypsnœa may demand laryngotomy or tracheotomy. Oil the probangs and œsophageal bougies before using them. The fingers are useful, not only for examining the pharynx, but for hooking out foreign bodies from its lower end. If the foreign body reach the stomach, keep the patient in bed, and give large quantities of bulky food, but no drugs.—C. B. KEETLEY.

ŒSOPHAGOTOMY.—Scalpels, forceps, (dissecting and artery), retractors, director, probe, œsophageal forceps, or some other long curved instrument to act as a staff passed down the œsophagus. Place a pillow beneath shoulders. Incision for five inches along anterior border of sterno-mastoid (left, unless foreign body project to right), with its centre opposite position of foreign body. Proceed as in tying carotid; but, instead of opening carotid sheath, retract it and its contents outwards. Retract larynx the other way. In opening œsophagus, take care not to wound recurrent laryngeal nerve. Feed for a few days through an œsophageal tube passed through mouth and beyond wound. Prognosis very good.

ŒSOPHAGUS, Stricture of.—*Forms*: 1, cicatricial after injury; 2, idiopathic fibrous, thickening; 3, syphilitic ulceration; 4, cancer; 5, pressure of neighboring tumors. No. 2 is very uncommon; No. 4 is, unfortunately, not so. The most usual form of tumor to compress, the œsophagus is a thoracic aneurism.

Signs.—The essential one is dysphagia—difficulty of swallowing. This may come on so gradually as to be unperceived until the power of swallowing anything but the smallest morsels has been lost. More or less pain. Progressive emaciation. The most terrible symptom to the patient is the feeling of unappeased hunger. Ulceration is indicated often by fetor of the breath, or by the presence of blood on a bougie passed gently.

To *diagnose* the nature of the stricture, whether cancerous or syphilitic or simple, consider the age, history, and collateral symptoms of the patient—*e. g.*, a tumor may be felt at the root of the neck, or cancerous glands may be found in the neck, or examination of the chest may discover indubitable symptoms of aneurism, and so on. The patient's feelings are deceptive as to the locality of the stricture; he usually referring it to beneath the manubrium sterni.

Prognosis.—In most cases, death from starvation, sometimes from hæmorrhage or the spread of cancer. Difficult to treat even a fibrous stricture successfully with bougies. Great gentleness, tact, patience, and perseverance may succeed. Whenever the cause can be removed, the prognosis is good, unless there be a severe ulceration, likely to be followed by cicatricial contraction.

Treatment.—First examine with a well-oiled bougie. If one can be passed gently, try to gradually dilate, by passing from day to day to increasing sizes, unless the cause be manifestly pressure from without, *e.g.*, aneurismal. If the cause be clear, of course treat it. In case of doubt iodide of potassium and rest are generally worth a good trial. Excision of cancer of the œsophagus has hitherto been unsuccessful; and gastrotomy (*quod vide*) has had discouraging results (two successes to many failures), perhaps partly because it is mostly postponed till too late. Life can be prolonged by nutrient enemata when swallowing has become impossible. —C. B. KEETLEY. *See Œsophagismus.*

OINOMANIA—*See Alcoholism.*

ONYCHIA—*See Nails, Diseases of.*

ONYCHIA MALIGNA is a term applied to a specific form of ulceration commencing about the matrix of the finger-nails. The disease is almost confined to children under ten years of age, and is by no means of frequent occurrence. Among more than seven thousand surgical out-patients under twelve years of age, I have found the disease in nine instances only, and these cases occurred between the ages of one year and seven.

Onychia usually has its origin in a pinch or a crush of the finger-end, such as may either bruise the matrix or loosen the attachments of the nail. Soon after the injury the finger-ends swell and fluid is effused beneath the nail, which latter loses its natural color, and becomes thin and flattered at the end, or more rarely curled up laterally. As it grows, it turns upwards from its normal attachment, and exposes beneath it an exceedingly foul and painful ulcer, having a peculiar and characteristic fetor; while the finger-end becomes greatly enlarged and bulbous-looking, its integuments being hardened, shining, and of a livid red color.

The disease seems little prone to spontaneous recovery; but may continue its progress until the last joint of the finger be lost, or the phalanx necrosed by extension of the ulceration.

The treatment consists, first, in the evulsion of the nail, if it be loose, displaced, or discolored; subsequently the ulcerated surface may be dressed with black wash, or a lotion formed of one or two drachms of the liquor potassæ arsenitis to an ounce of water. The arsenical application appears to exercise some specific effect on onychia and rarely fails. Such constitutional remedies as seem suitable to each case may at the same time be employed; and among these chlorate of potash, with bark, appears to be of use in many cases. Amputation has been occasionally practised as a cure for this disease, and a mercurial course has been recommended. The former is an unnecessary mutilation, and the latter is not required in the form of the disease described above.—THOMAS SMITH.

ONYCHOGRYPHOSIS.—This is the term applied to a condition observed most frequently in the little and great toes, in which the central portion of the nail becomes converted into an irregular clawlike or horny growth, ridged and more opague and brittle than the normal nail. It is due to the local hypertrophy of the papillæ of the matrix and of the nail bed in front of it, as a result of continued pressure.

The papillæ, sometimes two or three lines in length, project into the horny mass and form a tender, vascular core imbedded in greatly thickened epithelial layers, as seen in ichthyosis.—MALCOLM MORRIS.

ONYX—*See Cornea, Diseases of.*

OPHTHALMIA—*See Conjunctiva, Diseases of.*

OPHTHALMIA, Gonorrhœal—*See Gonorrhœal Ophthalmia.*

OPHTHALMITIS, Sympathetic—*See Ciliary Region, Diseases of.*

OPTIC NERVE.—Diseases; Neuritis; Atrophy.

OPTIC NEURITUS may extend from the brain to the retina (descending); may commence at the optic disc (papillitis) and thence pass along the nerve (ascending.) When the disc is affected there may be (*a*) simple congestion; (*b*) congestion with swelling, which renders the outline of the disc more or less obscure. *Causes.*—Cerebral tumor, meningitis, syphilis, albuminuria, lead-poison, wound of cornea, hypermetropia. The sight is affected in proportion to the change in the optic nerve fibres. There may be lessened acuteness of vision, limitation of field of vision, altered color perception. *Treatment.*—Endeavor to find the cause of the malady and treat this. Rest the eyes. In cases where syphilis is a known cause, give a prolonged but mild course of mercury and iodide of potassium. When syphilis is the probable cause, give iodide, and in the early stage give mercury also. In strumous cases, pursue tonic treatment.

ATROPHY OF OPTIC NERVE may commence without any visible inflammation of disc (primary), or may follow as a result of papillitis. The optic disc varies in appearance from slight pallor to bluish-white. The vessels may be of normal size, or may be much atrophied. *Treatment.*—Give quinine and iron internally. Phosphorus, nitrate of silver and strychnine are each sometimes employed. Try the interrupted voltaic current.—H. JULER.

ORCHITIS—*See Testicle, Diseases of.*

ORGANISMS, Microscopic, (Vegetable.)—Table of the chief diseases in which they have been found :—

Disease.	Organism.
Favus.	Achorion Schonleinii.
Tinea Tonsurans.	Trichophyton tonsurans.
Sycosis.	Microsporon mentagrophytes.
Pityriasis versicolor.	Microsporon furfurans.
Thrush.	Oidium albicans.
Concretions in the mouth, salivary ducts, and urinary bladder (including all carbonate of lime calculi).	Leptothrix.
Caries of the teeth.	Ditto.
Maglignant pustule, Anthrax (of animals).	Bacillus anthracis.
Malarious affections.	Bacillus malariæ.
Typhoid.	Bacillus typhi abdominalis.
Typhus.	Bacillus typhi exanthematici.
Leprosy.	Bacillus leprosus.
The Septic processes:—septicæmia, pyæmia, progressive suppurations, hospital gangrene, diphtheria, puerperal fever.	Cocco-bacteria (genus — "microsporina").
Mycosis septica (Orth).—a disease of new-born infants.	Cocco-bacteria.
Mycosis of the navel.	Ditto.
Acute exanthemata:—variola vaccina, scarlatina, measles.	Cocco bacteria (genus "monadina" of Klebs).
Inflammatory processes:—endocarditis, certain "rheumatic" or "fibroid" affections of the liver and kidney, which "lead more especially to formation of connective tissue, and not to suppuration."	Ditto.
Croupous pneumonia: –Erysipelas (allied to croupous pneumonia—Klebs).	Ditto.
"Certain puerperal processes."	Ditto.
Mumps.	Cocco-bacteria (genus—"monadina")
Tuberculosis.	Ditto.
Syphilis.	Ditto (variety "helicomonas" of Klebs).
Glanders.	Ditto.

Some of the diseases in which, though not hitherto observed, it is highly probable that microscopic organisms will be found are cholera, yellow-fever, and madura-foot.

METHODS OF STUDYING THESE ORGANISMS.—High power usually required. Many micrococci look small even when magnified 700 diameters. Most, but not all, resist the action of acids and alkalies, while animal tissues do not. Staining fluids; hæmatoxylin and analine dyes, especially latter. Special illumination apparatus: Abbe's. * Examination may be made of either (1) the diseased animal tissues, (2) the soil, water, or air in which some of the organisms unquestionably flourish, (3) cultivation-fluids and solids, or of (4) the tissues of animals artificially inoculated. When cultivation-fluids are used or animals inoculated, conclusiveness may be given to the experiments by separating the solid microscopic organisms from the liquid in which they lie. This is done in two ways—(1) Chauveau's, who used the sediment deposited by vaccine; (2) filtration through porous clay (Klebs); or through gypsum (Pasteur). Further, though individual animals have very similar susceptibilities to these organisms, yet different species are often very unequal in this respect. Thus the living animal body can be sometimes used as a filter, to separate even one kind of minute organism which infects the body generally from one which infects only locally.

Botanical Position.—The microscopic organisms, not animal, which are found in animal bodies in infective diseases, all belong to the sub-class

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* Made by Zeiss (London agent, Baker, of Holborn).

Thallogenæ. In the order hyphomycetæ are achorion, trichophyton, and oidium. In the order algæ is leptothrix. In the order schizomycetæ may be distinguished two widely different forms, viz., bacilli and cocco-bacteria. The bacilli have been respectively named after the diseases in which they occur. (See above.) Cocco-bacteria are divided again into microsporina and monadina.

Morphology.—In bodies so minute there cannot be great variety in shape. The chief forms are delicate rods and granules. The former are sometimes jointed, and the latter are frequently arranged in a chain-like series. When a number of bacilli are joined end to end a thread-like appearance results. Masses of organisms occur termed zooglœa. The size varies somewhat according to the species.

Parts They Inhabit.—Chiefly the blood-vessels. But those which are the probable causes of local diseases are found only locally. The contents and, still more, the walls of abscesses. Ogston says that they are always to be found in acute abscesses. Pyæmic deposits. The small metastatic deposits of pyæmia, puerperal fever, &c., consist of bacteria; and the discovery of this (by Rindfleisch) was "the first communication regarding the occurrence of bacteria in the organs of those who have died of traumatic infective diseases." (Koch.) Granulations. Joint-surfaces. Serous membranes. Diphtheritic exudations. Pus. Renal glomeruli and tubuli. Indeed, every organ or tissue where the blood can penetrate appears to be liable to invasion by some septic organism or another. The monadina are actively movable, and penetrate the cells, causing considerable swelling of them.

How do the Organisms enter the Body and whence do they Come?—They do not exist normally in the healthy body. The best observers, those who have added most positive information to our knowledge of minute anatomy, have been quite unable to find them herein. The same class are practically unanimous in rejecting the idea of spontaneous generation. Many of the organisms enter seldom or never except through wounds or slight abrasions, scratches or punctures. Others readily cling to and grow into the cells of mucous membranes. Possibly, some may have the power of piercing skin, or at all events the skin of a person not in perfect health. The organisms sometimes pass from one animal to another by contact with secretions or excretions, or, in a few instances perhaps, through the air. Some of the organisms exist constantly in certain localities in the air, the water, or the soil. Some cling to certain buildings, perhaps to the walls, floors, ceilings or furniture.

Do the Microscopic Organisms cause the Diseases, or are they merely accidental concomitants, "parasites of the disease," so to speak?—To answer the first part of this question positively in the affirmative, it would be necessary to demonstrate that (1) the organisms exist in every case of each disease; (2) that they exist also in sufficient numbers and in the proper localities to cause the phenomena of the disease; (3) that when transferred successfully and purely from one animal body to another of the same species they reproduce the disease. Moreover, it would be very desirable to show that the organisms of different diseases have themselves different morphological peculiarities. The difficulties of fulfilling all these requirements are immense; but they have been overcome in the case of a sufficient number of distinct diseases to encourage hope that ultimate success will attend the investigation of the others. Finally, it should be noticed that Koch, having produced pyæmia in mice, found that the micrococci adhered to the red corpuscles, and that the red corpuscles thus affected tended to crowd together in the capillaries. The ultimate success of this was thrombosis. This, perhaps, explains the occurrence of "metastatic" abscesses in pyæmia.

Many substances are fatal to every kind of bacteria. Such are carbolic acid, oil of eucalyptus, salicylic acid, and iodoform. There are strong reasons for believing that certain substances are especially destructive to particular species, *e.g.*, quinine to bacillus malariæ. Koch says that " Eidam came to the conclusion that different forms of bacteria require different conditions of nutriment, and that they behave differently towards physical and chemical influences." But it is not too much to hope that the marvellous resources of organic chemistry may soon prove to us that in science, as in law, there is " no wrong without a remedy." The discoveries of Pasteur, Chauveau, and Toussaint suggest the possibility of applying the principle of inoculation as a prophylactic against many, if not all, specific organisms. Pasteur has shown that by the action of heat and oxygen, organisms, deadly to certain animals, may be so modified that, while perserving the power of infection, they can infect only mildly, and yet protect the inoculated animal against future infection by more active organisms of the same species.

In constructing the above, unfortunately, very imperfect account of the present state of knowledge concerning a subject of absorbing interest and vast importance, I have been chiefly indebted to Koch, on the " Etiology of Traumatic Infective Diseases," translated for the New Sydenham Society by Cheyne, and to the addresses of Pasteur and Klebs at the International Congress, 1881. In these may be found the names of the numerous workers who have discovered what is at present known of the subject. —C. B. KEETLEY.

OSTEITIS DEFORMANS
OSTEO-ANEURISM } *See Bones, Diseases of.*

OSTEO-ARTHRITIS, Chronic—*See Chronic Gout.*

OSTEOMATA—*See Exostoses.*

OSTEO-MYELITIS.—Diffuse inflammation, and suppuration, in the cancellous tissue, an affection to which French pathologists have given the name of " osteo-myelitis" is more frequently recognized in post-mortem examinations than at the bedside of the patient. The more acute and more extensive cases of this affection are closely allied to pyæmia, and are usually or at any rate very frequently, followed by that mode of death. It bears the same relation to the medullary tissue as the complaint just spoken of does to the periosteum; but the difference in character between the periosteum and the medullary tissue, the latter being so much more rich in vessels, especially in large patulous venous channels, gives to osteo-myelitis a gravity even beyond that of diffuse periostitis. It is well known how often diffuse suppuration is found in the diploe of the cranium after scalp-wounds, and how the " puffy tumor of Pott" is frequently only the sign of such suppuration; and further, in what a large percentage of such cases evident pyæmia is found. It is probable that in all these cases the external table of the bone has been wounded, and the diploe thus exposed; in fact, the only known cause of osteo-myelitis is a wound which exposes the cancellous interior,* or an injury to the interior of the bone, perhaps unaccompanied by external wound, as in fracture. It is a frequent cause of death after amputations and other surgical operations in which bone is divided.

When a bone is examined in which osteo-myelitis has run an acute course, the cancelli are found loaded with pus, and the medullary tissue usually injected and often sprinkled with ecchymoses; the periosteum also is often in the course of separation from the bone; but the bony tissue itself does not generally show any appreciable change. In the larger bones the disease usually terminates fatally at this stage; but should the patient survive, the pus may penetrate into neighboring parts, most probably into the nearest joint, or central necrosis may result.

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* Unless the infection of constitutional syphilis should be added.

The symptoms of this grave affection are exceedingly obscure; it, like other extensive and acute affections of bones, is often accompanied by diffuse inflammation of the soft parts, which then masks the deeper affection. Rigors and general fever always mark the onset of acute osteo-myelitis, but the only known spinal symptom of the disease in the bone is the separation or recession of the periosteum from it, accompanying diffused pain in the bone, and not caused by effusion on the external surface of the latter. After amputations, a prominent fungus mass is often seen projecting from the end of the bone, and proves the existence of a certain extent of inflammation of the medullary tissue; but this need not necessarily have affected the bone so extensively as to deserve the name of osteo-myelitis ; in fact, that affectionis seldom recognized before death.[*]

To obviate the formidable dangers, and the extensive disintegration of parts connected with osteo-myelitis, it is justifiable in any case where pain in the bone, accompanied with the ordinary symptoms of acute suppuration (rigors, fevers, etc.), but without signs of external or periosteal mischief, induces a reasonable suspicion of this affection, to expose the surface of the bone by a free incision. Should the periosteum be found separated, or even separating, from the bone, the diagnosis of diffused suppuration in the cancelli will be rendered highly probable. When this separation of the periosteum has proceeded to any great extent, amputation of the member, or excision of the diseased bone, is certainly indicated. It should be remembered that the disease is a rapid one, the fatal complications of internal phlebitis and pyæmia imminent, and therefore treatment, to be effectual, must be adopted early. Medicine, as might be expected, has little effect on the disease; but the fever which accompanies it should, of course, be treated on the ordinary principles. In deciding on the question of removing the diseased bone (an operation which would in ordinary cases be held to be contra-indicated if pyæmia had set in), it should not be forgotten how much the early symptoms of systemic infection resemble those of typhoid fever, so that it may be proper in doubtful cases to give the patient the benefit of the doubt and attempt to relieve him from the source of irritation.

In chronic osteo-myelitis the removal of the limb is frequently successful in affording the patient relief from an abiding source of irritation, which will at length otherwise prove fatal; but when this affection is limited to a portion only of the bone, the expectant treatment is indicated, and the patient may recover after the extraction of a sequestrum.[†]—T. Holmes.

OSTEOTOMY.—A term now practically confined to the division of bone for deformity, with, at most, the removal of a wedge-shaped piece.

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[*] If after an amputation acute osteo-myelitis be suspected, the surgeon can establish his diagnosis by putting the patient under chloroform, and ascertaining by means of the probe that the whole medullary tissue is broken up for a considerable distance, as well as the small portion which is projecting out of the wound. See Fayber in *Indian Annals of Med. Science*, Oct. 1865. The symptoms of acute osteo-myelitis are pain in the part, œdema, and swelling extending down the limb ; general fever, with quick pulse, and increased temperature, and more especially the recision of the soft parts, including the periosteum from the bone, which is then left denuded at the bottom of the wound.—*St. George's Hospital Reports.*

[†] I would refer on the subject of chronic and acute osteo-myelitis, to the well-known paper by M. J. Roux, read before the *Academie Imp. de Med.*, and to the criticisms of M. Legouest, M. Larrey and others on it, which are so be found in the Society's *Bulletin* for 1859–60, vol. xxv. ; to a paper by Mr. Longmore, in *Med.-Chir. Trans.* vol. xlviii.; and to one by myself, in *St. George's Hospital Reports*, vol. i., quoted above.

Instruments.—Saws, osteotomes and chisels. Saws are very narrow and either blades or chains. Osteotomes resemble chisels, but they are bevelled on both surfaces, while the chisel proper is bevelled only on one. The temper of the steel and angle of the bevel are of high importance in the case of osteotomes and chisels. Improper instruments would easily cause fatal results, or at all events, splintering of bone, great shock, perhaps failure to attain the object aimed at, and occasionally a piece of the chisel left in the bone. A proper osteotome can be driven by a mallet through the femur of an ox without splintering the latter or damaging itself. Never use a hammer. Osteotomes are used for simple division. Chisels are entirely unfit for this purpose except in the case of very small bones, and should be reserved for removing wedge-shaped pieces. Place limb on a sand pillow, moistened just before operation and covered with waterproof.

Management of the Saw.—Adams's is commonly used. It has a shank and is usually pointed. The soft structures are incised with a long tenotomy knife down to the bone, and the periosteum is cut with the same knife. The orifice of the incision is usually only half an inch long, or even less. The knife being withdrawn, the saw is passed into the tunnel just prepared for it and its cutting edge turned to the bone. The saw is generally withdrawn when two-thirds of the bone are divided, then the remainder is broken.

Use of the Osteotome.—Insert a scalpel right down to the bone at the place to be divided. Wait two or three seconds, to give the muscles penetrated time to quiet, then complete incision. Size of incision should at first be large enough to admit finger. As operator gains experience he will venture safely to dispense with this and pass in the osteotome alone. Incise in line with the bone to be divided. Rotate osteotome when it reaches the bone. Do this lightly so as not to damage the periosteum. Hold handle of osteotome firmly in left hand, with ulnar border of that hand against the skin of the limb. The direction and management of the instrument vary with the site of operation. As a rule, cut away from large arteries and divide the hardest part of the bone first. When removing the osteotome, keep the thumb and first two fingers closed upon it, and gradually work it out by alternate contractions and relaxations of the other fingers. When two-thirds of the bone are divided, the rest can usually be broken.

In using the chisel turn the bevelled side towards the wedge. If the wedge is to be thick, cut a thin wedge first and chip away other pieces from each side of the gap.

Never use either osteotome or chisel as a lever to break bone. Keep saws, osteotomes, and chisels bright and free from rust, or they clean themselves in the bone. Check all hæmorrhage before dressing. When both limbs are osteotomized, the first wound can be compressed with an antiseptic sponge and gauze bandage while the other is being operated on. Operate strictly antiseptically. Cut away any projecting cellular tissue, as it delays cicatrization. Use no drainage tube unless some accidental circumstance occurring during the operation leads you to expect suppuration. Healing usually takes place by organization of blood-clot (*See* Wounds), but by granulation where cellular tissue is exposed uncovered by blood.

After Treatment.—Take temperature morning and evening. A temperature of 101° demands inquiry. It may arise from some quite accidental complication independent of the operation, or from a tight bandage, or from an accidental sore throat, or trivial ailment. If it cannot be thus accounted for, expose and examine the wound. After osteotomy of the lower limbs, unless the divided bone is supported in a firm plaster case, some contrivance is useful to facilitate defecation, *e. g.*, a mattress with a movable central piece, or my stretcher. Immediately after the bone has been divided it should at once be put into the position ultimately required. After osteotomy of the limbs, attend during the first twenty-four and forty-eight hours very carefully to the state of the toes or fingers, as the case may be. They should be free from numbness and obstructed circulation. Permeation of discharge should be looked for from day to day, though it seldom occurs after the first two days. So long as it is absent the dressing does not need removal.

GENU-VALGUM, OSTEOTOMY FOR.—*Place of Incision for McEwen's Operation.*—On the inner side of the limb, at a point where the two following lines bisect one another: a line drawn a finger's breadth above the level of the upper border of the external condyle, and a line drawn parallel to and half-an-inch in front of the tendon of the abductor magnus. *Management of Osteotome.*—To begin with, place it against posterior part of inner border of femur and cut from behind, forwards and outwards, away from femoral artery. Remember that, just above the condyles, the outer border of the femur is thicker than the inner. *Place of Incision in Chiene's Operation.*—"An incision two to three inches in length is made over the tubercle" (that of the abductor magnus,) "and is carried upwards for a sufficient distance." *The Wedge.*—"The long axis of the wedge runs downwards and outwards towards the notch between the condyles." Grasp the tibia at its lower extremity, and by pressure upwards bend the neck of bone attaching the condyle to the femur. (See *Edinburgh Medical Journal*, 1878). *Ogston's Operation for Genu-valgum.*—If the genu-valgum be severe operate with the knee bent, otherwise with the knee extended. A tenotomy-knife is inserted at a point as far back as the level of the internal condyloid ridge, and about four inches above the most prominent point of the internal condyle. It is passed downwards, outwards, and forwards, to the notch between the two condyles, until the point can be felt projecting in front of that notch. Before withdrawing it, the periosteum and cartilage are incised. An Adams's saw is now passed in, and the internal condyle sawn two-thirds off. Now, extending the limb (if it has been flexed hitherto), and using the tibia as a lever, with the operator's knee as a fulcrum, the limb should be bent inwards till the internal condyle cracks off and slips upward. With splints and pads place and keep the limb straight till union has taken place. Commence passive motion about the end of the third week. Of course, use strict antiseptic treatment. (See *Edinburgh Medical Journal* March 1877.) *Dressing, etc., of Osteotomies for Genu-Valgum.*—See general remarks above. Well and judiciously padded box-splints are commonly used. But, as few or no changes of dressing are usually required, the limb can be once for all fixed in a moulded case of plaster of Paris or similar material.

OSTEOTOMY FOR ANKYLOSIS OF HIP IN A BAD POSITION.—If there be a good neck to the femur, in other words, if the great trochanter appear to be set far enough away from the os innominatum, divide the neck of the femur. Otherwise operate below the great trochanter. *Division of Neck of Femur with an Osteotome.*—Bisect a line between the ant. sup. spine of ilium and the ant. sup. angle of the great trochanter. At the point thus found, pass in a sharp-pointed steel director backwarks, inwards, and a little downwards till it stops at the neck of the femur. Along the director pass a scalpel down to the bone; first cut towards the trochanter, then, rotating the director and reinserting the scalpel, cut towards the anter. sup. spine. The incision should just admit the forefinger. Do not draw the director till the osteotome is inserted. Rotate osteotome so as to bring it across the neck of the femur, cut nearly through and break the rest. *Division of Neck of Femur with Saw* (Adams's operation).—W. Adams passes in a long tenotomy knife "a little above the top of the great trochanter," and straight down to the neck of the femur. He divides the muscles and "opens the capsular ligament freely." A narrow-bladed saw is passed into the wound and across the front of the neck of the femur, with its flat side against the bone. It is now turned on edge and the division accomplished. Extension by weight, and without any splint, after osteotomy of the neck of the femur, is to be preferred. Sometimes a second weight pulling outwards from upper third of thigh adds to comfort. When it is used a felt splint should be moulded to the inner side of the thigh to distribute the pressure. Keep the foot perpendicular, or even a little inverted.

REMOVAL OF WEDGE OF BONE FOR CURVATURE OF TIBIA.—Use a chisel. Make a single incision, the loose skin will permit this to be moved up and down. The wedge need not go more than three-fourths through the bone. Supposing it to be made at the apex of the angle of curvature, its upper surface should be at right angles to the border of the tibia above, and its lower surface at right angles to the border of the tibia below. When adjusting the bony surfaces avoid nipping muscle. The fibula can either be broken or divided through a separate incision of the soft parts. See general directions above.

Every commencing osteotomist should study McEwen's book.—C. B. KEETLEY.

OSTITIS—*See Bone, Diseases of.*

OS UTERI, Rigidity of the.—*Definition.*—A condition of the os uteri in parturition where dilatation is very slow or seems arrested.

Causes.—Early escape of the liquor amnii; nervousness; induration from areolar hyperplasia; abnormal toughness of the lower segment of the cervix, elongation of the cervix, cancer of the cervix.

Symptoms.—Pains severe and painful; pain referred to the sacrum; patient hot, restless, and intolerant of the pain.

Signs.—Pulse frequent and hard, or full and bounding; os felt as a hard ring, each pain making scarcely any impression on it. In cancer, the diseased cervix felt as a hard, irregular, nodulated ring.

Diagnosis.—By the touch not difficult to differentiate.

Prognosis.—Varies with the case.

Treatment.—Chloroform; chloral; nauseating doses of tartarized antimony; the application to the cervix of a small portion of belladonna ointment; hot vaginal injections or a hot hip-bath; warm enemata. Should these fail, dilatation by Barnes's bags, and if necessary incision of the os; forceps, cephalotripsy, Cæsarian section.—HEYWOOD SMITH.

OTORRHŒA.—The acute form of otitis media purulenta usually shows a tendency to self-limitation, or, if properly treated, makes a good recovery, with the exception of a few cases, where the constitution may be at fault. Illustrations of this may be seen in tuberculous or strumous subjects, in the syphilitic or in chronic Bright's disease, in the severer forms of exanthematous otitis, or that dependent on other fevers, or even a state of general depression of the vital energy. In these instances the disease passes on to a condition in which there is little resemblance to its former state. Instead of active hyperæmia, there is passive; the parts are rather pale than intensely red, as in the acute disease. There is absence of pain usually, and the discharge is somewhat more scanty; the aperture in the membrane may grow larger rather than smaller, or remain stationary; the constitution suffers from the prolonged disease and we have an altogether different kind of an affection to deal with. The discharge being an important symptom, the disease has from time immemorial been called otorrhœa. It is one of the gravest affections of the ear and results in more mischief than any other ear affection except, possibly, one or two. The quality of the discharge must needs be largely purulent as in the acute form, with the exceptions that it may frequently contain mucus, or serum, and when granulation tissue or a polypus exists there is likely to be blood. It is from this disease that cerebral abscesses frequently result, with or without thromboses, and perhaps obliteration of the sinuses in the vicinity of the ear. Pyæmia and septicæmia, with possibly metastatic abscesses, are sometimes found. Labyrinth disease occasionally results from extension of carious processes to the petrous portion of the temporal bone. The whole of the bony surroundings of the organ of hearing may also be removed by these processes. Paralyses are frequent, more especially that of the facialis, as its canal, the Fallopian, passes along the inner wall of the tympanum, and occasionally is only protected from the cavity by a membrane instead of its thin, normal bony covering. The ossicula may fall out of the ear as a result of the chronic suppurative process, either in a state of necrosis or otherwise; their ligaments having been destroyed by ulceration. The stapes, however, usually remains fixed in its oval window, although it may be removed entire. All forms of chronic mastoid affections are likely to have this disease for an exciting cause. Aural polypi are mostly the result of this disease. Many forms of diffuse inflammation of the meatus are caused by otorrhœa, the discharge often being very ichorous in character, irritates the canal into inflammation, and occasionally deep grooves may be furrowed in the canal. Chondritis and perichondritis of the cartilage of the meatus and auricle sometimes results from extension of the middle ear disease to these parts. So grave is this malady that for many years life insurance companies have refused to take a risk on a patient who has for some time had a discharge from the ear. The discharge is more profuse in cases of children than adults as a rule, and may be accounted for on the theory of the greater vascular activity of the parts in the former. Sometimes it nearly disappears without treatment, and the patient will exclaim that he is convalescent, but on careful inspection the remains of the membrane will be found smeared over with a whitish or yellowish material, possibly resembling the membrane itself, and it may have a light reflex upon it. Some very ridiculous mistakes have been made by beginners in inspection of these parts, and it may be laid down as a good rule that if there is any suspicion of a discharge, pass in the cotton on the holder and gently wipe the parts. The patient may occasionally have a relapse of pain, and the discharge will suddenly increase in quantity, become sometimes purulent, but more frequently ropy mucus will be observed. The bad smell of the discharge is due to: 1st—uncleanliness; the secretion is allowed to remain and undergo decomposition; 2d—some varieties of polypi produce an unpleasant odor in the discharge; 3d—carious bone. The latter gives a very dreadful odor to the discharge, not, however, as offensive as that from ozæna with carious bone. If there are any malignant polypi or growths the smell from the discharge may be very offensive indeed. There is a form of discharge called "cheesey," which may be composed in part, possibly, of tuberculous matter, and which, according to Dr. Buck, in his book on Diagnosis and Treatment of Diseases of the Ear, may be absorbed into the system and produce general tuberculosis. This material, according to Dr. Wilde, has "a peculiar, heavy sickening smell;" whether this depends on decomposition is not exactly known; I am inclined however to believe that it does. Another interesting fact about the discharge is, that the patient often hears better while the ear is running: when it stops he hears worse. Various explanations have been given for this phenomenon which are not satisfactory on the whole. It is possible that in a temporary arrest of the discharge the parts may be somewhat more hyperæmic than before, and this would account for the diminished hearing. When the discharge has ceased permanently from real arrest of the inflammatory process, however, we cannot conclude that there is then increased hyperæmia.

Appearance on inspection.—Before looking carefully at the ear it must be cleaned. Do it in the following manner: First syringe with quite warm water, pointing the beak of the syringe successively towards every part of the canal and membrane. The auricle may be grasped and pulled backward, upward and outward, so as to straighten the canal. Syringe very gently. Previous to syringing, inflate the ear by Politzer's or Valsalva's method, so as to blow secretion from the Eustachian tube and tympanum. After syringing, epidermic scales and sticky secretion may still remain; this may be wiped away by means of brushes made of absorbent cotton wound on a cotton holder. A really good cotton holder may be extemporized from a common hair pin, straightened out; the ends may be roughened with a file or by rubbing them against any gritty substance to remove the paint, when by dipping them into water, they will catch the cotton sufficiently well; nay, these are better than the ordinary cotton holder, for the latter has a heavy handle which dulls the tactile sensibility. Moreover, the hair pin may be obtained of any size desired, even to an instrument of very delicate proportions. The cotton holder should be used with great delicacy, as much harm may result from harsh manipulations within the meatus or tympanum. The forehead mirror should be used to illuminate the parts, so that every step may be carefully taken. The canal and membrane are likely to have a macerated appearance, and if the epidermis is intact it will be of a grayish-white color and somewhat wrinkled. When the latter is removed, as it may be naturally or by the wiping of the cotton, the parts may look red, or of a pale salmon color, or even whitish. The canal may be so swollen, especially in children, as to be closed; it may also show the deep grooves before described, and which may bleed easily; its entire wall may be uniformly of a dull gray color, from the maceration, or be faintly reddened. Granulations and polypi may be seen springing from the canal, wherever there is an ulceration. In children also, in very old cases, the canal may, after a while, become much too wide from atrophy of its subcutaneous connective tissue, including its fat element. The drum membrane must needs be perforated or have been at some previous time, and evidence of repair may be observed. Its color will be red or reddish where the epidermis is removed, or grayish if it be intact, unless it be not much moistened by the discharge, when it will be quite like the pearly gray color of the normal membrane, but always opaque, although it generally is more or less reddened. The perforation in the membrane may leave only a grayish rim of drum membrane, having the shape of a sickle, and even in some cases no vestige of this may be visible; but usually a considerable portion of the membrane is left. The perforation is very frequently in the lower part of the membrane. The malleus handle and short process seem to prevent the membrane in its vicinity from being destroyed, so that the perforation will resemble in shape a kidney with its hilus presenting at the end of the malleus handle; perforations may occur in front of the malleus handle, and behind, in the same membrane. Perhaps the most frequent site of the perforation is behind the malleus handle near its extremity. The membrane, above the short process is frequently perforated, which is an unfavorable location for healing. *The site of the perforation* may be only a dark looking spot or point if it be small and the tympanum insufficiently illuminated (*i. e.* by the small aperture), but if it be of considerable size then the red color of the inner wall of the tympanum will conspicuously show, especially if it be somewhat swollen or granular. The remains of the membrane are often sunken, so as to be, at the perforation edge, quite in contact with the promontory. Naturally in this position the malleus handle will be much retracted and foreshortened, and the short process will appear quite prominent from the turning outward of the opposite end of a lever represented by the end of the malleus handle being drawn so far inward. The perforation whistle may be elicited, but if the edges of the perforation are adherent to the promontory, then air may not even enter the posterior part of tympanum but may enter the part next the Eustachian tube (ant. part), but cannot escape through the meatus. Whenever there is a rupture of the membrane with ulcerated edges at the border, or the lining of the tympanum has assumed a condition called granulation tissue, we are likely to have polypi. There is microscopically little difference between granulations in the tympanum and true aural polypi. Below is given the examination of a large sized polypus from the tympanum of a patient who has had several removed previous to this one. There is, however, no suspicion of malignancy, as the appended examination indicates. It is done by Dr. T. Mitchell Prudden, Pathologist to the Manhattan Eye and Ear Hospital. It is as follows:

"There is abundant gelatenoid, scantily fibrillated basement substance in which are embedded numerous larger and smaller spheroidal, fusiform and branched cells; many of the cells are crowded with pigment. Small and thin walled blood vessels are abundant, especially near the surface of the tumor. The whole tumor is covered with lamellated columnar epithelium, which is in part ciliated. Anatomical diagnosis: myxoma polypoides." Where the polypus springs from parts covered by skin, the covering of the polyp is likely to resemble integument rather than mucous membrane, otherwise they are quite identical with the polypus of a mucous membrane. Polypi of the ear have been divided into many varieties. Wilde has made a very beautiful and somewhat fanciful division, but which seems to the writer based on differences which have no bearing on the indications for treatment subsequently required. Some are harder and more fibrous than others; some are extremely soft and jelly like. The shape depends mostly on mechanical causes, while in the canal they must needs be narrow, but if the growth extends beyond the meatus it widens out. Some are more highly vascular than others and bleed more easily. When the growth extends so as to come in contact with the outer air, it then has a paler color, or even may approach that of the skin, and the covering will be nearly as thick as that of the neighboring integument. Many malignant tumors of the tympanum and meatus simulate polypi, and, in the end, the only means of diagnosis is the microscope. If, however, the tumor grows with any great rapidity, after removal, bleeds more than usual, has a more offensive smell, and is possibly painful, and there is paralysis of parts in the neighborhood, we may suspect a malignant growth.

Treatment is done with a view to arrest the discharge; it has been, for a long time a question whether it is safe to arrest somewhat suddenly a chronic discharge from the ear. I remember a little patient some years since with this disease, whom I treated until the discharge ceased and the membrane had healed. Polypi had previously been removed. Within a month or two the child had a relapse of ear trouble with brain symptoms, and the little patient died. The family felt sure that the treatment was the cause of the catastrophe, and I, myself, have always felt sure that possibly if the patient had been let alone that death might not have resulted. In a general way, one would suppose that in a case with profuse discharge, great relaxation of tissue, and almost an entire absence of hyperæmia, that any sudden arrest of the discharge would almost call for some compensating drain on the system, elsewhere, to prevent dangerous local hyperæmia. A firmly seated prejudice generally, has some excuse for it. On the whole I am in favor of arresting the discharge from an ear as soon as possible. The first important step is to cleanse the ear. This has already been dwelt upon.

Some form of astringent or stimulant is indicated. Arg. nit. in strength varying from two grs. to the ounce to a saturated solution (not far from 500 grs. to the ounce), may be used. It should never cause excessive or long-continued pain, and the discharge should usually grow thinner and diminish in quantity, and it should not make the ear tender or feel "sore." Before knowing of Schwartzer's nitrate of silver treatment, I had used saturated solutions of it in otorrhœa. Sometimes arg. nit. aggravates the symptoms; then discontinue. The weak solution may be used two or three times a day; the strong, once in one, two or three days. Do not repeat the application as long as the good effect of the first continues. I am in the habit of dropping a little into the ear with a medicine dropper, the head being turned to one side. Allow it to remain a minute or two, then syringe out with water. Other astringents proper to be used are plumb. acet. 2 to 10 grs. to the ounce of water or sulph. zinc (of the same strength) may be poured into the ear after cleaning thoroughly once or twice a day. Do not do too much syringing. Chloride of zinc resembles the arg. nit. in its properties, but it is sometimes painful; may be used as directed for the last. Acid. tannici ʒ i., glycerine ℥ i m. may be dropped into the ear once daily and allowed to remain in until the next cleansing. To correct the bad odor it is often sufficient to keep the ear clean, but if the discharge is excessive it may be necessary to use carbolic acid ʒ i. to Oj. of water freely poured in and allowed to remain; repeat several times daily. The liq. sod. chlo., one or two drachms to the ounce of water, may be used in the same manner. If the membrane is pretty well swept away, and the parts are much relaxed, it may be well to pack the tympanum with absorbent cotton, either with or without an astringent or disinfectant. It should, however, be removed if it causes any pain, tinnitus or dizziness, or if it seems to prevent the discharge from making its exit from the ear. If the source of the otorrhœa seems to be the Eustachian tube, then the astringent may be forced in gently, by applying the nozzle of a syringe into the meatus, which must fit it air tight. A piece of rubber tubing stretched upon a good sized tip of a syringe will fulfill this indication. The remedy may easily be driven into the throat through the Eustachian tube. In children this is especially easy of accomplishment. The late Mr. Hinton, of London, devised this method. Be careful and not apply too much force or cause any unpleasant symptoms to the patient by this mode of procedure. If a given application does not act satisfactorily, change to another, as it is not possible to always determine the exact indications for the selection of any one remedy. In many instances the treatment is overdone, and by interrupting it sometimes for a few days, the patient will be found to instantly improve. Latterly boracic acid has answered very well indeed, in arresting the discharge, whether the tympanum were granular or not. It is also good in the subsiding stage of acute cases. The meatus should be packed full of the finely powdered acid. Let it remain until the discharge has moistened its way through the mass, then remove it by syringing and reapply. In some cases the surgeon will be surprised to find that his running ear has suddenly dried up, and it may so remain for some days, in consequence of a single application, although this is not the rule. The only way to properly reduce the boracic acid to a sufficiently fine powder is to have it done at the wholesale druggists, by appropriate machinery. The admixture of inert substances with it to facilitate the reduction to a powder, diminishes the effectiveness of the remedy, and should be avoided. The mode of procedure in case of granulations or polypi is as follows: remove the polyp of granulation and cauterize its base, so as to complete the removal, and diminish its chance of return, or remove the polypus by cauterization or by the shrinking process of stimulant astringent applications. To dispose of a polypus by an astringent or stimulant, the nitrate of silver may be used, although Schwartzer has laid it down as a principle, that this is one of the conditions not indicating the use of this remedy. I have seen a polypus of two lines in diameter dispersed by four or five applications of a 40 gr. sol. of the argent. dropped into the ear and allowed to thoroughly reach all parts of the polypus. A saturated solution of alum will sometimes remove a small sized polypus by a few applications. This and the arg. may be used every one, two or three days. The objection to the alum is that it sometimes produces alum curds, which act as foreign bodies, irritate the tympanum, and are often difficult of removal. If the polyp is punctured with a hypodermic syringe, and any strong astringent injected into the substance of the growth, it acts quite effectively in removing the neoplasm. The liq. ferri sesquichloridi is a useful remedy for this purpose, ar the liq. ferri persulph. After one of these injections it will be well to wait a few days to see if any considerable reaction results. As has before been stated, the boracic acid in powder will sometimes disperse a polyp of small size. Cauterization alone is only adapted to the cure of minute polyps or granulations. For this purpose the saturated solution of the arg. nit. is valuable and safe, as it does not destroy tissues adjacent to the polyp. Nitric acid is more effective, but not as safe; it is in danger of destroying more tissue than is desired. The acid nitrate of mercury is very effective indeed, but there is danger of considerable reaction from its use, and the amount of tissue destroyed cannot always be limited. Iodoform blown into the ear has some power in destroying polyps, but it has a very unpleasant odor. If the polyp is of considerable size, it must be removed bodily, or recourse must be had to the galvano-caustic. Wilde's snare has for many years been a popular method for their removal. Where the polypus has a peduncle and is of considerable size, this method is a very brilliant one and is deservedly popular. Blake, of Boston, has devised a snare, somewhat more delicate and artistic in structure than the Wilde, and is a very beautiful instrument indeed. The principal difficulty in snaring out a polypus is that the wire is not sufficiently pushed into the ear so as to effectually catch the whole of the tumor. By means of the forehead mirror and a probe, the wire may be carefully pushed to the bottom of the polyp and securely caught upon it. It is well to draw gradually at first until sure that the wire has sufficiently engaged the polyp; then draw firmly, so as to nearly cut it off; then by a sudden but not violent jerk, extract the tumor. Naturally, care must be taken not to engage any of the ossicula in the wire loop. The principal objection to the snare is, it does not remove all of the tumor, is painful, it not being possible to work the instrument without some little violence; moreover, only a certain number of polypi or granulations may be caught by the snare. The writer's usual mode of procedure is to use some form of forceps. The small-sized straight fenestrated forceps used in nasal polypi, having a fixation catch to keep them closed, is an admirable instrument. The same with the handle bent at a right angle enables the surgeon to see better. If the fenestration is very large, so as to leave a cutting ring at the bite of the forceps, it will catch most admirably. If the arms of the forceps cross each other, so as to make a reverse opening, it will do better in a speculum. Gruber's forceps and Hinton's simpler form are of this construction. The writer has a mouse-toothed forceps made on this principle, by Tieman & Co., of New York, which is admirable for catching very minute polyps. It is better to extract without the speculum when possible; when not, use the Gruber speculum or any convenient variety of bivalve speculum, taking advantage, in the introduction of the forceps, of the fact that there is a fissure in the speculum. The forceps require to catch the polyp very securely, or nothing will be accomplished. In the soft, slippery, gelatinous polyp, the bite of the instrument may not catch more than if a jelly fish were in its grasp. In this dilemma, drop in a 40 gr. sol. of arg. nit. and coagulate the polyp, when it becomes much easier to get hold of, and is removed without difficulty. The bleeding will often much embarrass the operation; then pour in more arg. nit., or some ferruginous styptic, and when it is arrested, make another effort at extraction. The writer, however, in order to save time when the site of the tumor is exactly known, goes in again and again with the forceps, even when the canal is filled with blood and nothing is visible. It would be injudicious, however, to recommend an inexperienced person to do this. The object of the fixation to the forceps is, that after the polyp is fairly caught in the bite of the instrument, this is maintained by the catch, and the operator is free to treat the polyp as strongly or gently as he likes, his sense of touch not being impaired in the effort to hold on to the polyp. Torsion is the best method of removing a polyp by this method. If the instrument has an uncertain hold on the tumor, by twisting it may then secure such an attachment to the neoplasm as to extract the whole of it at once. Dr. Buck, of New York, has an instrument for scraping out polyps and granulations. The writer has little experience with it, but has heard it very favorably spoken of. After the removal of the polyp by any of the best methods, there usually will be a little remaining. This may be destroyed by cauterization. Saturated arg. nit., nitric acid, or the acid nitrate of mercury are the best agents for accomplishing this purpose. Boracic acid will sometimes accomplish this end. If a minute point of dead bone is seen, it will be well to use one of Dr. Buck's larger scrapers for its removal. Gruber has an instrument in his tenotomy case which would accomplish this.

It may not be necessary to mention that the presence of dead bone will often cause a polyp to be reproduced, perhaps as long as it remains. There seems to be no special rule as to how often a polyp may return, or whether it returns at all, except this matter of dead bone. I have removed a polyp in a given case some dozen times, and at last have had the membrane heal completely, with no further trouble with the growth. The galvano-cautery is an admirable method of removing polyps, but it is on the whole more expensive and troublesome than an ordinary case warrants.

A few cases of suppurative otitis refuse to take on reparative action; the relaxed condition continues, there is no tendency even to the formation of polyps or granulations, and absolutely no tendency to repair. Sometimes this is explained on the theory of tuberculosis or struma.

Bright's disease, or diabetes, will often interfere with repair; sometimes it is simply unaccountable. In a large number of cases, however, the tendency to repair is decided; the whole of the membrana has been restored, with most of its normal characteristics present, but the new formation is more likely to be of the nature of cicatricial tissue, and considerably thinner than the normal.

Frequently the edges of the perforation are sunken, so as to be in apposition with the promontory. In this position they may become adherent thereto and close the drum cavity. The latter may then be a circular cavity, or if the membrane has been mostly swept away in one meridian, the tympanum may be divided into two unequal halves, so that the part next the entrance of the Eustachian tube, at the anterior portion of the tympanum alone, will become inflated with air on Politzerization. Inasmuch as the contact of air with the tympanum excites undue secretion, and the closing of a perforation being indicated to resist this tendency, the artificial drum membrane may be used for this purpose. The one known as Toynbee's is in common use. It consists of a plate of India rubber as thin as paper, and attached to a wire a little longer than the depth of the meatus. The rubber membrane may be trimmed off with scissors, so as to be easily pushed down upon the remains of the old membrane. In addition to the closing of the cavity of the tympanum, it also presses the ossicula firmly together, if they have been separated by relaxation or ulceration of their ligaments, thus restoring vibratory continuity between the membrana and oval window. These are the principal reasons for using the artificial membrane. It is not as popular as formerly, and has somewhat fallen into disuse, as it frequently re-excites the discharge, causes pain, tinnitus, and dizziness. In a certain percentage of cases, it improves the hearing while worn, provided it is placed upon exactly the right spot; this is determined by experimentation. The patient himself may apply the drum membrane more successfully often than even the surgeon, and, indeed, he needs to be taught how to do it, for the membrane should only be worn for a few hours at a time during the day, and never in the night, as at best it is an irritating foreign body. Within two or three years the Yearsley cotton pellet has become much more popular than formerly as a substitute for the Toynbee drum. Quite a small bit of cotton wool is rolled into a rounded mass, and by the aid of a pair of forceps or a probe it is pushed into position.

If there is a small perforation, it is better to press the cotton directly upon it, although here, as in the case of the other membrane, experiment needs to determine exactly where it must touch to produce a maximal improvement to the hearing. This may be often worn most of the time; it aids the membrane in healing, and may by its presence cause the absorption of some small polyps. The same precaution in applying it where there is considerable discharge must be observed in this instance as in that of Toynbee's. After the patient has recovered from the disease, the greatest precaution needs to be taken to prevent a relapse. If a slight cold is taken, the patient may again have a running at the ear, with or without pain; and the membrane, which previously had healed, may again rupture, requiring weeks or months of time to repair it.

A greater danger than this, however, is the tendency of the disease to involve the brain and destroy life.—OREN D. POMEROY.

OVARIOTOMY.—*Operation.*—The patient should be prepared by rest for a few days or weeks, by leeches and poulticing if there is any abdominal tenderness, or by venesection if there be any incompressibility of the pulse.

In a paper read before the British Medical Association in 1876 my father says: "As a rule, advanced cystic and other diseases of the ovary, requiring operative treatment, are accompanied more or less with inflammation, partial or general, of the peritoneum proper to the cyst itself, or covering adjacent organs. The pathognomonic signs of this condition are often indistinct; but where, in addition to abdominal pain, there exist crimson lips, and a hard though small and very incompressible pulse, so that no pressure above by an assistant obliterates the radial pulsation, venesection will generally relieve this state, and show by the buffed and cupped character of the blood, if drawn pleno rivo, and by the excessive proportion of firm crassamentum in comparison with the serum, an element of mischief which, in the prospect of ovariotomy, it is most desirable to remove. It has been, therefore, my custom of late to employ phlebotomy before operating; either to take a small quantity for the purpose of testing the quality of the blood, or the existence of inflammatory action; or, when the pulse and other symptoms demand it, a larger quantity (from eight to ten ounces or more), occasionally repeating it, or otherwise applying leeches to the seat of pain, to the anus, or to the uterus. By reducing the patient in this way, as well as dietetically, to the condition opposed to that which predisposes to inflammation, hæmorrhage, and serous exudation, she is so prepared that she is more likely to escape from any unfavorable consequences after operation ; and the result of such practice has justified the means employed."

For the operation the patient should be placed on a firm table, her water drawn off, and a mackintosh with a hole in it fixed by adhesive plaster to the abdomen to guard against wetting the clothes. The incision to be in the median line, about four inches long, reaching to within one inch of the pubes. A long incision may be unnecessary if there are no adhesions; an incision too short may embarrass the operator should hæmorrhage occur in the breaking down of adhesions. Should the tumor be adherent to the abdominal parietes, and the separation of the parietal and cystic layers of peritoneum not be evident, it is better to continue the incision upwards to where the curve of the tumor naturally separates the layers, and then to follow the separation downwards. If this precaution be not taken the peritoneum may be stripped off from the abdominal parietes. The hand should then be introduced to feel if adhesions exist, and if so, they should be gently but steadily broken down ; a large trocar is then thrust into the cyst and the fluid drawn off, taking care that no fluid escapes into the abdomen. Should the contents not flow readily, or if there exist other secondary cysts, the trocar should be withdrawn, the opening enlarged, and the secondary cysts tapped or broken down with the hand. As the cyst empties it is to be steadily drawn out of the wound, any adhesions that come into view to the omentum or bowel peeled off or tied with gut or silk, and cut off, or divided with the cautery ; the tumor should then be supported by an assistant while the pedicle is secured. There are two methods of securing the pedicle—the extra-peritoneal and the intra-peritoneal. The best extra-peritoneal method is that by Spencer Wells's clamp ; this is firmly fixed round the pedicle and the tumor cut away. If it is decided to treat the pedicle by the intra-peritoneal method, the best plan is to clamp it with Baker Brown's clamp, and sever it with a hatchet-shaped red-hot cautery iron ; or a better plan is to cut the tumor away to within about a quarter of an inch of the surface of the clamp, and then carefully cauterize the stump, taking care to use the iron sufficiently hot to thoroughly char the stump, and to leave a charred ridge slightly projecting above the clamp. A flat warm sponge should be placed in the abdomen to defend the bowels from injury, and others placed on the skin round and under the edge of the clamp. It is a good plan before cauterizing the stump to apply torsion to any large vessel that may appear on its surface.

Should the nearness of the tumor to one cornu of the uterus preclude the use of the clamp, the pedicle should be transfixed by a stout double carbolized silk ligature, and each half tightly tied, the operator guarding his hands from cuts by the ligature with cloths ; the ends of one ligature should then be passed round the whole pedicle and also securely tied ; the tumor may then be cut away. In the last two instances, before the cautery clamp is removed or the ligatures cut short, the pedicle should be held while the abdomen is carefully sponged out, which should be continued until all fluid of whatsoever sort is removed.

Before the wound is closed the abdominal parietes should be examined, if adhesions have been separated, in order to stop any bleeding ; the bleeding points should be touched lightly with the hot iron or the petroleum cautery. If the bleeding is not thereby stopped, tie with gut or silk ligature.

To Close the Wound.—(1) With the clamp. Place the clamped pedicle at the lower angle of the wound, and having a sufficient number of carbolized silk sutures threaded with a needle at either end, pass the first suture from within the abdomen through the peritoneum about half an inch from its cut surface close to the pedicle, and place the rest of the [illegible] *half* or three-quarters of an inch apart ; then the ends being sponge placed in the abdomen to prevent blood from the wound trickling in having been removed, the sutures are to be tied, care being taken that they do not slip. Dry sulphate or perchloride of iron should then be placed on the stump, and little bags of lint filled with carbolized disinfecting powder placed along the wound, over these a folded cloth, then pieces of strapping two or two and a half inches wide, and long enough to reach over the hips on either side; then a mass of cotton-wool, and over all a flannel binder, or the wool may be placed between two cloths and the strapping put on over.

(2) With the cautery clamp. Take off the screw, and then, an assistant holding the pedicle with flat forceps underneath the clamp, very slowly and carefully separates the blades; if any spot of blood appears, it is better to ligature that point rather than trust to a further cauterization.. The stump should not be touched, but be allowed to drop slowly into the abdomen. Sutures as above described are then to be passed, and the wound dressed as before.

In like manner (3) with the ligature, the ends to be cut short off and the pedicle allowed to drop in. 20 minims of tincture of opium in 1 oz. of tepid water should then be thrown into the bowel, or ½ gr. of morphia injected hypodermically, and the patient placed in bed.

The after-treatment consists in keeping the viscera at absolute rest for at least 48 hours. No food should, as a rule, be given; occasional teaspoonfuls of tepid water may be administered by the mouth, or if sickness ensues, small pieces of ice sparingly given. After which, should no unfavorable symptoms arise, beef tea may be given from time to time by spoonfuls. The water should be drawn off as required.

The wound should not be disturbed for two or three days, after which it is to be dressed daily in the same manner as at first. In a few days, if all is going on well, the patient may be carefully lifted on to another bed, and this process may with great advantage be repeated every two days or so. If the case does well, the patient is usually convalescent in three or four weeks.

Should, however, symptoms of peritonitis arise, and the state of the pulse warrant it, rapid and free venesection holds out the best chance for recovery, together with, if necessary, calomel and opium in large doses, followed by quinine, or the patient should be kept deeply narcotized.

Should symptoms of septic poisoning supervene, it is best to reopen the wound and carefully remove by syringe or sponges the fluid which will be sure to be present in the abdomen; or if this is present in sufficient quantity to distend the recto-vaginal pouch, puncture with a trocar may greatly relieve the symptoms. In some cases it is advisable to place a glass drainage-tube in the lower angle of the wound, reaching down to Douglas's pouch; this forms a small well, out of which any accumulating fluid can easily be removed with a syringe.

Such cases give rise to great anxiety, and should be most assiduously watched and nursed.—HEYWOOD SMITH.

OVARITIS—*See Ovary, Inflammation of.*

OVARY, Diseases of.—OVARY, INFLAMMATION OF.—*Definition.*—Ovaritis—single or double, acute or chronic—whether primarily of its parenchyma, or of its investing membrane. *Causes.*—Cold, especially just before or during the catamenia; convection of inflammation from pelvic peritonitis; tents; sudden suppression of catamenia; gonorrhœa, masturbation, and other causes of recurrent congestion. *Symptoms.*—Constant pain in one or both inguinal regions, occasionally extending down the leg to the foot, and to the mamma on the affected side; increase of pain during the catamenia; tenderness on pressure; defecation also produces pain; nausea; fever. *Signs.*—The ovary can be felt to the side and rather posterior to the uterus on examination by the simple touch and also by the conjoined examination, as an irregular slightly nodulated movable body. The ovary thus touched and pressed upon is very tender, giving rise to pain that shoots upwards to the mamma. *Diagnosis.*—Difficult where pelvic peritonitis also exists; but the exquisite tenderness of the organ itself, its shape and non-existence of fixidity of the uterus, would facilitate the diagnosis. *Prognosis.*—Usually favorable, though the duration of the malady may be tedious. *Treatment.*—Absolute rest; leeches to the anus, the inguinal region, or the cervix uteri. Poultices, opium, blisters or iodine to the inguinal region; sedative pessaries; bromide of potassium, hot hip-bath. Utero-gestation in chronic cases gives the ovaries rest for many months.

OVARY, ABSCESS OF.—*Definition.*—Disintegration of the products of inflammation, resulting in the formation of pus. *Causes.*—Acute ovaritis, pelvic peritonitis, tubercle, dermoid or fœtal cyst, inflammation of ovarian cyst. *Symptoms.*—Rigors, severe throbbing pain. *Signs.*—Elevation of temperature at night; tenderness; probable fluctuation. *Diagnosis.*—By the above signs. From pelvic abscess very difficult. *Prognosis.*—Doubtful. It might burst into the cavity of the peritoneum and prove fatal, or favorably into vagina, rectum, or oviduct, or the abscess may burst and a pelvic abscess result, the abscess being circumscribed by adhesion to bowels, such abscess usually being situate in the recto-vaginal pouch, or towards one side. Poultices. *Treatment.*—If it point towards the abdomen, rectum, or vagina, open with trocar or bistoury. Opium and quinine, nourishment, and, if necessary, alcohol.

OVARY, HÆMORRHAGE OF.—*Definition.*—Hæmorrhage takes place from rupture of the ovary or distended or varicose ovarian vessels. *Symptoms, etc.*—See Hæmatocele.

OVARY, ATROPHY OF.—*Definition.*—Congenital, rare. Physiological, at the menopause, morbid. *Causes.*—Menopause, pelvic inflammation, acute ovaritis. *Symptoms.*—Diminution or absence of sexual desire; diminution or absence of catamenia. *Signs.*—Progress towards male type in voice, aspect, tendency to growth of hair on face. *Diagnosis.*—From above symptoms and signs. *Treatment*—By stimulus to uterus to incite ovulation by galvanic intrauterine stem, by ice bag to sacrum, by emmenagogues.

OVARY, HYPERTROPHY OF THE.—*Definition.*—Enlargement of the parenchyma, rare. *Causes.*—Hyperæmia, or perhaps a remote result of inflammation. *Symptoms.*—Sensation of weight in iliac regions, and dysmenorrhœa. *Signs.*—Swelling in the inguinal region; dysuria. The enlarged organ felt on examination. Experience alone will help to differentiate it from abscess, cyst, or malignant disease. *Diagnosis.*—Difficult; turgescence during catamenia, and subsidence afterwards. *Prognosis.*—Favorable. *Treatment.*—Iodine over innuinal region and in vagina; iodides. Rest during catamenia.

OVARY, CANCER OF.—*Definition.*—Malignant deposit, primary or secondary; scirrhus; medullary, or colloid. *Causes.*—Unknown. *Symptoms.*—Lancinating pains *in loco.* Malignant cachexia; if colloid, often pyrexia. *Signs.*—Ovary felt to be hard, nodulated, enlarged, and after a time fixed; if colloid, giving sensation akin to fluctuation. *Diagnosis*—By character of pain, constitutional effect, sensation to the touch, and the history. *Prognosis.*—Unfavorable. *Treatment.*—Sedatives; if free, removal. See Ovariotomy.

OVARY, FIBROUS TUMOR OF.—*Definition.*—Fibrous tissue deposits, rare. Adenoma pure, also rare; associated more often with some form of malignant disease. *Symptoms, etc.*—Similar to ovarian cysts, which see below the tumor, however, presenting hardness as its chief characteristic, together with comparative slowness of growth. *Treatment.*—See Ovariotomy.

OVARY, CYST OF.—*Definition.*—Ovarian dropsy. Simple or unilocular, compound or multilocular, and dermoid. Cysts may form in the stroma of the ovary, or may be formed by dropsy of one or more Graafian follicles. In many cases it seems as if the cyst was the result of an attempt at unimpregnated ovum development, as the formation may take place in cases where (1) there is absence or deprivation of the sexual act in the unmarried or widows; or (2) where the sexual act is not followed by impregnation; or (3) where the sexual act has taken place for the first time after the menopause, lighting up, as it were, a tendency to ovarian activity not resulting in impregnation. *Causes.*—Obscure, often ovaritis; some referred to under definition. *Symptoms.*—Dull pain over ovarian region. Gradual spammenorrhœa; dragging pains in various positions, dysuria, frequency of micturition, difficulty in defecation, fatigue. Symptoms at first often slight, afterwards loss of flesh; dyspnœa; pain occasionally from peritonitis. *Signs.*—Abdominal swelling; differentiated from flatus by resonance; from fecal accumulation by touch and catharsis; from pregnancy by the absence of the proper signs, and by reasonable delay; from tumor of the uterus by absence of menorrhagia and metrorrhagia; by natural size of uterus unless traction for some time has elongated that organ; by mass being usually separable from the uterus; by absence of leucorrhœa; by fluctuation and its character; from abdominal dropsy by definiteness of tumor at commencement; by resonance in the flanks when the patient is supine; by change of posture not greatly altering the area of dulness; by absence of bulging in the recto-vaginal pouch; by absence of cardiac, renal, or hepatic disease; by absence of anasarca of extremities; from hydatids by aspiration; from hydronephrosis or pyonephrosis, by history or origin of tumor. A malignant ovarian tumor is characterized by the rapidity of its growth, pain, its consistency, its effect on the constitution, the frequency of associated peritonitis, and often its apparent adhesion to the abdominal parietes. The suppuration of a cyst is indicated by rigors, hectic flush, and nocturnal exacerbation of temperature. *Diagnosis.*—Ordinarily not difficult, if attention is paid to the above spmptoms and signs; difficult when associated with pregnancy, fibro-cystic or fibroid disease of the uterus, or with malignant deposit. *Prognosis.*—If left alone, unfavorable; duration about four years. *Treatment.*—By tapping or by removal, ovariotomy, (or more correctly, *ovariectomy*). Tapping may be had recourse as to a means of diagnosis, or of temporary relief; but as a rule the cyst speedily refills, rendering a repetition of the operation necessary. Tapping is not without risk. If the cyst contains pus or colloid substance, or cells in a state of active growth, the escape of the contents into the cavity of the peritoneum is very apt to set up dangerous peritonitis. The only radical cure is ovariotomy; and when we consider that in the hands of skilled operators the mortality has been reduced to 8 per cent., the operation is comparatively a safe one, and at all events holds out a good prospect of saving life. See Ovariotomy.

OVARY, DISLOCATION OF.—*Definition.*—One or both ovaries may be dislocated into the recto-vaginal pouch, or, more rarely, they may pass into the inguinal canals; or into the labia majora, or, more rarely still, descend as a femoral hernia. *Causes.*—By strain, sudden jerks, inflammation, hypertrophy, extrauterine fœtation. *Symptoms.*—Pain, dull aching, and of a sickening character, often produced into one or both mammæ. *Signs.*—Examination detects them as slightly irregular, mobile, tender bodies. *Diagnosis.*—From other swellings by the peculiar pain and tenderness, especially at the catamenial nisus, and the recognition by the touch of the irregular mobile body. *Treatment.*—Replacement where possible, and sustentation by truss, pessary, or bandage. Should this be impossible from adhesions, or severe symptoms arise, ovariotomy might be advisable.

Ovary, Hernia of.—This is extremely rare, and is generally associated with intestinal hernia. *Treatment.*—The ovary must be replaced with the intestine, and retained by proper appliances.

Ovaries, Absence of.—Congenital, rare, and associated with absence of development of other organs of reproduction. *Symptoms.*—The girl remains undeveloped; catamenia absent. *Treatment* is, of course, worse than useless.—Heywood Smith.

OZÆNA—*See Nose, Disease of.*

PAINTERS' COLIC—*See Saturnism.*

PALATE.—Cleft Palate.—A congenital deformity, due to non-union of palate plates of palate bones and superior maxillaries with their fellows, or of the superior maxillaries with the præmaxillaries, or to non-union of the two halves of the soft palate. The amount of imperfection varies from merely bifid uvula to a complete chasm from pharnyx to face. Often complicated with hare-lip. The parts affected are more or less stunted in growth; hence width of cleft varies.

Treatment.—An infant with cleft palate cannot suck; hence it requires hand-feeding. But it should be hand-fed with its mother's milk only for the first two months. Upon all cases, except a few in which the cleft is too wide, a plastic operation must be done. If possible, operate before the child has begun to talk. When the cleft is hopelessly wide let a dentist fit the mouth with an "obturator" of gold or vulcanized rubber.

Staphyloraphy (for cleft of soft palate).—Essential steps of the operation are three, viz., (1) paring edges of cleft, (2) uniting them by sutures, (3) incising to relieve tension. Chloroform children. Anæsthesia optional in case of adults. Insert Smith's gag. (It is well to see that this gag fits on the day before the operation.) The edges are pared by means of long forceps and long-handled knife. Avoid unnecessary or rough sponging as it increases flow of saliva. Sutures are of horse hair, catgut, silk and silver wire. Their strength is in the inverse order in which they are named here. The ends of silver wire may irritate the tongue. Alternate sutures of horse-hair and silk answer well. The sutures are passed by long-handled and curved needles. Startin's needle. Plan of passing thread through one flap, then through loop of a thread already passed through other flap, and lastly dragging it completely through by means of this loop. There is a simple little instrument for twisting wire sutures. Pass most of the sutures before tying one. Check bleeding before tying. Bleeding rarely troublesome. Iced water, gentle pressure with small sponge, and waiting a minute or two, suffice to check it. The accessory incisions to relieve tension may be done (1) a few days before the operation as suggested by Callender, or (2) just before the operation, or (3) just after the operation. There are either (1) simply lateral cuts parallel to the cleft and close to alveoli, or (2) more scientifically planned proceedings to divide levator palati and palato-pharyngei. Palato-pharyngei divided by merely snipping across posterior pillars of fauces. Two ways of dividing levator palati, viz., Fergusson's and Pollock's. Few people competent to perform either with certainty after merely reading a verbal description, while anyone can do either after half-a-minute's practical illustration. Fergusson divided the perpendicular part of the levator palati midway between the Eustachian tube (its origin) and the hamular process, where it bends into the palate. Pollock divides the horizontal part of the levator palati as it lies in the soft palate. Fergusson used a rectangular knife, which he passed through the cleft in the palate. Pollock uses a straight knife, which he passes through the soft palate close to th hamular process (which can be felt with the finger). "If the palate not come easily together, two lateral oblique cuts may be made, one on either side, above the highest suture, separating the soft from the margin of the hard palate to a small extent."—(T. Smith.)

HARD PALATE, OPERATION FOR CLEFT OF.—Resembles, in principle, that for cleft of soft palate. Mucous membrane and subadjacent periosteum are scraped from lower surface of palate plates. Incisions are made along alveolar border of palate, and the edges of the cleft pared. Then the loose dependent flaps are brought together in the middle line, and united by strong sutures. Beware of "button-holing" the flaps in scraping them. Various forms of raspatories may be used. In separating the flap from the bones, work from without inwards.

When to Remove Sutures.—Lower two on second day, the rest alternately, according to position, on third and fourth day. Soft food till union is complete. The less conversation the better. The last observations apply to both hard and soft palate. Cleft of both hard and soft palate may be dealt with at one operation.

PALATE, NON-MALIGNANT TUMORS OF, are usually either (1) cystomata, or (2) fibromata, or (3) papillomata. Abscess also occurs.

PALATE, ULCERATION OF, a frequent result of syphilis, but not always specific. *Treatment.*—Mercurial gargles and specific remedies.

PALATE, PERFORATION OF, the result of disease (syphilis, more rarely small-pox and measles) or injury, may require an obdurator.—C. B. KEETLEY.

PALMAR FASCIA, Contraction of the.—The palmar fascia is an aponeurotic expansion beneath the integument of the palm of the hand, attached at its upper extremity to the transverse carpal ligament, and to the aponeurosis of the palmaris longus, where it is not more than an inch in breadth, and where its fibres are compacted into a firm mass of considerable thickness. The lower extremity expands to nearly the whole breadth of the hand, and is much thinner than the upper extremity—many of the fibres being inserted into the skin in front of the metacarpo-phalangeal articulations, and others, extending along the sides of the fingers, are attached to the sheaths of the flexor tendons. The morbid condition of the fascia, which constitutes the subject of the present paper, is usually, if not always of traumatic origin, being the result of frequently repeated and protracted pressure of hard substances against the palmar integument, as in rowing a boat, or in handling an axe, a chisel or other tools. As a consequence of the pressure to which the integument of the palm is subjected, it becomes more or less inflamed and indurated, and more firmly adherent to the subjacent fascia, which gradually contracts so as to induce a permanent flexion of the fingers, at first to a slight degree, but progressively increasing until in some cases the ends of the fingers are almost in contact with the palm of the hand. There is for the most part, little or no pain when the parts are left to themselves, but great resistance is offered to any attempt at extension, and severe pain is induced, if much force be employed in this way. No resistance is offered to the attempt to flex the fingers to an additional degree. Indurated and knotty cords can be seen and felt, extending from the palm to the fingers, and the firmness of these cords is greatly increased by an attempt to extend the fingers. These cords are formed by contracted bands of the palmar fascia together with the closely adherent integument. The skin of the palm at a number of points is drawn into folds in the form of arcs of circles whose concavities look downward towards the fingers. The disease not only produces very considerable deformity, but the functions of the hand are seriously impaired. This morbid condition may be confined to one hand, or both may be involved. The fingers are not usually all contracted to the same degree. The ring finger is generally more flexed than the others, and the little finger more than the index or middle finger. In some cases there is in addition to the contraction of the palmar fascia, a contraction of the sheath of one of the flexor tendons, producing a more obstinate and unyielding flexion of the affected finger. This contraction of the sheath of the tendon is usually confined to the vicinity of a single articulation, ordinarily that of the first with the second phalanx. Contraction of the palmar fascia is to be carefully diagnosticated from persistent flexion of the fingers occasioned by other causes. One or more of the fingers may be permanently flexed in consequence of division of the extensor tendon of the same finger or fingers by direct mechanical violence or by sloughing. Flexion of the fingers may also occur from cicatricial contraction after severe burns, or wounds, or contusions with loss of substance. It may occur from paralysis of the extensor muscles, from gouty, or rheumatic, or traumatic inflammation of the digital articulations, or from spasmodic or organic contraction of the flexor muscles. There is for the most part no difficulty in the diagnosis, if the condition of the parts and the history of the case be carefully investigated. Flexion from paralysis of the extensor muscle, or division of the corresponding tendon is distinguished by the fact that no resistance is offered to passive extension of the finger. Cicatricial contractions are recognized by the history of the case, and by the obvious appearance of the scar. Flexion from articular inflammation is distinguished by the swollen condition of the joint, and the rigidity which constitutes an obstacle not only to extension but to further flexion. Flexion from persistent contraction of the flexor muscle or tendon is recognized by the tension of the affected tendon, and the ease with which the finger may be extended when the flexor muscle is relaxed by extreme passive flexion of the wrist.

Contraction of the palmar fascia has not usually been recognized by writers on surgery. The flexion of the fingers depending on it, has generally been ascribed to other causes, especially to abnormal contraction of the flexor tendon. One of the first authors who recognized the true character of the disease was Dupuytren, and the first published account by him is contained in his "Lecons Orales de Clinique Chirurgicale." He quotes Boyer, who gives an account of flexion of the fingers, due to what he calls Crispatura Tendinum, or contraction of the tendons. It is evident from Boyer's description, that the abnormal contraction, which he erroneously describes by this name, is located in the palmar fascia, and not in the tendons. Boyer suggests that, in the early or incomplete stage of this disease, it might be arrested by confining the hand to a straight splint, but that when it has reached a considerable degree, it is an incurable disease, a "mal sans remedie."

Dupuytren also quotes Sir Astley Cooper, who speaks of the fingers being retracted in consequence of chronic inflammation of their sheaths, and of the palmar fascia. When the contraction is confined to the palmar fascia, he recommends the division of the contracted band, and the application of a splint to straighten the finger. But he regarded the case as beyond the reach of art, when the sheath of the tendon was involved.

Dupuytren first demonstrated the true character of the disease, on the death of an old man, who had long been affected with a persistent flexion of the fingers. He examined the hand with great care, dissecting off the skin from the palmar surface of the hand and fingers. As soon as the skin had been removed from the subjacent parts, its arched folds and wrinkles were at once effaced, showing that the proper seat of the contraction was in the skin itself. The fingers remained flexed; on attempting to extend them, the movement was arrested by firm fibrous bands which evidently belong to the palmar fascia. He then divided the contracted bands of the palmar fascia, and there remained no obstacle to the complete extension of the fingers. He then opened the tendinous sheaths, and found the tendons in a perfectly normal condition. He also examined the digital articulations, and found them entirely free from disease. He thus demonstrated the fact, at that time generally unknown to the profession, that the seat of the contraction was in the palmar fascia, and not, as had been generally supposed, in the flexor tendons.

Having arrived at a correct appreciation of the true pathology of the disease, Dupuytren, not long after, had the opportunity of undertaking the treatment of a case. On the twelfth of June, 1831, he operated on a wine merchant, who had flexion of the ring and little fingers, occasioned by contraction of the palmar fascia. He divided the contracted bands, straightened the fingers, and confined them to a padded splint in an extended position. The operation was followed by a considerable amount of inflammation and suppuration, but the wounds were thoroughly cicatrized by the second of July. The splint was worn day and night until the second of August, after which it was worn only at night. The fingers were at first very stiff, and their motion very imperfect, but the patient gradually regained the power of flexing and extending them.

Since Dupuytren first demonstrated the true character of this disease, and furnished a detailed account of its treatment, the subject has been largely ignored by the profession, and comparatively few surgeons have made any allusion to its pathology or its treatment.

My attention has been directed to the disease for several years past, and my observation has, in the main, confirmed the correctness of Dupuytren's description. I am satisfied, however, that he has erred in excluding contraction of the sheaths of the tendons from any participation in the production of the deformity. There are, no doubt, many cases in which contraction of the palmar fascia is the exclusive cause of the persistent flexion of the fingers, but I hardly think it possible that my observation could have deceived me as to the fact that, in some cases, the tendinous sheath is also at fault.

With regard to the prognosis, it may be regarded as an established fact, that the disease, when left to itself, undergoes no amelioration, and that whatever change takes place is from bad to worse. But if the contracted bands be thoroughly divided, and the affected fingers brought into an extended position, and secured by proper splints, and if passive motion be vigorously and persistently applied, the deformity may be effectually overcome, and a very useful degree of motion may be restored. But my observation does not lead me to the belief that, in old cases, perfect freedom of motion can ordinarily be regained. The operation of dividing the contracted bands should be performed while the patient is under the full influence of an anæsthetic, and consequently the operation itself occasions no pain. But the subsequent treatment is tedious and painful, being protracted through a period of several months. The patient should be fully informed beforehand that it is no trifling infliction that he is to undergo. But if he has the proper degree of fortitude to endure the curative process, he will be amply rewarded by the result of the treatment.

In dividing the contracted bands of the palmar fascia, I recommend that incisions be made at a number of points, wherever they are capable of relieving tension. The adhesion of the palmar fascia to the skin is so close that a strictly subcutaneous section cannot be made, but the skin should not be divided more extensively than is absolutely required. The wounds should be at once closed with adhesive plaster, and the fingers should be brought into an extended position. This position should be maintained by applying to the back part of the fore-arm and hand, and of the affected fingers, a metallic splint, adapted to the surface, with an intervening layer of lint, or of cotton or woolen batting. The fingers should be secured to the corresponding portions of the splint by narrow strips of adhesive plaster. The fore-arm and hand may be secured by means of a roller bandage. The dressings should be renewed at intervals of one, two, or three days, the parts should be washed, and wiped dry, and passive motion should be freely applied. Passive motion is quite painful to the patient, but it is an important means of restoring mobility to the fingers.

In each of the hands on which I have operated for contraction of the palmar fascia, and of the sheaths of the flexor tendons, after the fingers had been straightened, and the deformity removed, the power of flexing the affected fingers was very much diminished, and the attempt to flex them occasioned severe pain. The inability fully to flex the fingers, and the pain occasioned by the attempt, occurred not only in those fingers which had been abnormally flexed by the disease, but in those whose condition had been normal when the treatment was commenced, whether the affected fingers had been confined to the splint, or had been left at full liberty during the whole of this treatment. The ability to flex the fingers to the full extent is very slowly regained, and in some cases the patient never fully regains it. It is somewhat remarkable that, while the obstinate forced flexion occasioned by the disease can be in a great measure or wholly overcome in a comparatively brief period, the power of flexion should be lost, and that its restoration should be attended with so great difficulty, and should require so long time. But even with this drawback, the substantial benefits resulting from the treatment commend the curative process to the attention of surgeons, and entitle it to rank among the established resources of the healing art. —ALFRED C. POST.

PALSY, Scrivener's—*See Paralysis, Local.*

PALSY, Shaking—*See Shaking Palsy.*

PANCREAS, Diseases of the.—I. CLINICAL CHARACTERS.—1. Pancreatic affections are frequently attended with painful sensations, which are described as lying deep in the abdomen, a little below the epigastrium. The pain often shoots in various directions, and occasionally comes on in violent paroxysms, resembling those of hepatic colic. In some cases there is deep tenderness.

2. Important symptoms are believed to arise from changes in the quantity or quality of the pancreatic secretion. When formed in excess, being at the same time usually of an irritable quality, this secretion is supposed by some to be the cause of a form of pyrosis, attended with the discharge of a viscid, slimy fluid, as well as of diarrhœa; the stools containing a tenacious material, or presenting sometimes dysenteric characters. On the other hand, deficiency or absence of pancreatic juice from the alimentary canal, whether arising from changes in the gland tissue or obstruction in connection with the duct, and abnormal quality of the secretion, have been considered to give rise to a characteristic phenomenon, namely, the passage of a large amount of fatty or oily matter in the stools, which separates from the general mass of the fæces. Frequently there is constipation at the same time, the fæces being dry and hard. Other digestive derangements are common, and may be partly due to the absence of pancreatic juice from the bowels.

3 Pressure upon or irritation of neighboring structures is often a cause of prominent symptoms in pancreatic disease, especially jaundice, vomiting, eructations, and other gastric disturbances, and aortic pulsation. Pain is also partly due to this cause in many cases, resulting from pressure on the nerves in the vicinity or on the vertebræ, the latter being occasionally eroded.

4. Physical examination may reveal certain morbid conditions of the

pancreas, but it requires to be performed very thoroughly, and in many cases repeatedly, the stomach and colon being empty, before a satisfactory conclusion can be arrived at. The healthy pancreas can now and then be felt on making deep pressure in very thin persons with loose abdominal walls, especially if the spine is somewhat curved forwards; this is more frequently the case when the organ is enlarged and hardened. It is, however, in the detection of a tumor of the head of the pancreas that physical examination is of most value. This is distinguished by the following characters: *a.* It is situated deeply at the back of the abdomen, in the region of the pancreas:. *b.* The dimensions are always small, and the shape generally more or less rounded. *c.* The tumor is quite fixed. *d.* It feels dense and hard. It must be mentioned that marked pulsation and bruit may result from pressure of the pancreas upon the aorta.

5. Pancreatic disease is often attended with general symptoms, namely, extreme emaciation, anæmia, and debility, due to interference with nutrition and other causes.

II. Special Diseases of the Pancreas.—These need but a very brief consideration, and some of them only require enumeration.

1. *Pancreatitis.*—Acute inflammation of the pancreas is very rare. It is said to be characterized anatomically by hyperæmia, swelling, induration or softening, and exudation into the cellular tissue and upon the surface, occasionally ending in purulent infiltration or the formation of abscesses. The last event is said to be not uncommon as the result of metastasis from the salivary glands and testis. Very rarely the inflammation ends in gangrene. The symptoms are described as dull deep-seated pain in the region of the pancreas, nausea and vomiting of a viscid liquid, thirst, constipation, and some degree of pyrexia. Rupture of an abscess may give rise to serious symptoms.

2. The following morbid conditions may be mentioned together, viz.: (i.) So-called hypertrophy, which generally involves the entire gland, and is the result of chronic inflammation, or of long-continued mechanical congestion from portal obstruction, the pancreas being enlarged and hardened. This organ is said to be not uncommonly hypertrophied in cases of diabetes. (ii) Atrophy, usually associated either with senile changes, some kind of cachexia, local disease of vessels, or pressure upon the organ as the result of surrounding disease. (iii.) Induration or softening, with or without hypertrophy or atrophy. (iv.) Fatty infiltration and degeneration. If these conditions give rise to any symptoms at all, they are those indicative of deficiency or abnormal quality of the pancreatic secretion. A hypertrophied pancreas may be felt in some cases, and occasionally it gives rise to pressure symptoms.

3. Not uncommonly calculi form in the pancreatic duct, which may be in large numbers and of some size. They interfere with the escape of the secretion. I am not aware that their passage causes any symptoms. The branches of the pancreatic duct are sometimes dilated into cysts.

4. The most important disease of the pancreas is scirrhus of the head of this organ. There is a difference of opinion as to the nature of this morbid condition, some pathologists regarding it as scirrhus cancer, others considering that it is merely due to fibroid changes resulting from chronic inflammation, and the latter affirm that the pancreas is peculiarly free from cancer, escaping often even when the disease involves all the surrounding structures. I have had the opportunity of observing several cases of this disease, and of making a post-mortem examination in four of these cases, in which certainly the affected portion of the pancreas presented well-marked general and microscopic characters indicative of scirrhus cancer. The mass varies in size, but does not attain large dimensions; it has an

extremely hard and dense consistence, and a whitish section. It frequently becomes adherent to, or even involves the duodenum, which may be ulcerated and greatly narrowed. It may also form adhesions with other structures, to which the disease may subsequently extend. The pancreatic and common bile-ducts as a rule become obstructed. The latter is usually supposed to be closed owing to pressure being exerted upon it by the enlarged pancreas, but this effect is probably more frequently due to contraction about the orifice or in the course of the duct, from changes in its own tissues, jaundice and its accompanying phenomena necessarily resulting. The body of the pancreas is usually enlarged; sometimes it is atrophied. Now and then serious disorganization of neighboring parts is occasioned, leading to erosion of the vertebræ, perforation of the diaphragm or the opening of a large vessel.

But little is known about the etiology of this disease. Generally it occurs in elderly persons, but one of the most marked cases I have met with was in a young man aged 23. In only one instance was there any history of intemperance.

Symptoms.—The clinical history of scirrhus of the pancreas is decidedly indefinite and uncertain. In general terms the clinical phenomena may be stated as deep pain in the region of the pancreas, aching, gnawing, or lancinating in character, or sometimes attended with a sense of burning or tightness, in some cases greatly increased paroxysmally, and also frequently intensified by food, coughing, deep breathing, movement, or the supine position ; deep tenderness, nausea, and vomiting, in some cases of a severe character; various digestive disturbances, the tongue, however, being often quite clean; jaundice frequently intense; the passage of much fat in the stools, the bowels being usually constipated; the detection of a tumor having the characters already described, accompanied with great general wasting, anæmia, and debility. As showing the irregular and ill-defined clinical history of cases of this disease, I may state from my own observation that there may be no pain or tenderness from first to last; that symptoms due to biliary obstruction may be the only prominent phenomena throughout; that it may be impossible to detect any tumor; and certainly that excess of fat in the stools is by no means always observed.

5. Among exceedingly rare morbid deposits which have been found in the pancreas are mentioned encephaloid cancer, colloid, melanosis, and tubercle.

Diagnosis.—Only scirrhus of the head of the pancreas can be diagnosed with any approach to certainty, and in many cases it is exceedingly difficult to arrive at any positive conclusion, at all events for some time. The chief diseases for which this condition is liable to be mistaken are affections of the stomach, especially about the pylorus, of the duodenum, or of the liver. The paroxysms of pain may closely resemble those associated with the passage of a gallstone. Occasionally, by pressing on the abdominal aorta, scirrhus of the pancreas gives rise to pulsation and bruit, simulating an aneurism. Whenever any of the symptoms above mentioned are complained of, and especially jaundice coming on without any obvious cause, pancreatic disease should always be borne in mind. I believe that it not uncommonly escapes recognition simply because it is never thought of. An important step towards a correct diagnosis consists in excluding as far as possible affections of all neighboring structures. It must be remembered that the liver is liable to be enlarged, as the result of obstruction of its duct associated with pancreatic disease. Physical examination is of essential value in diagnosis, and in doubtful and obscure cases it should be thoroughly carried out again and again, by which means a satisfactory conclusion may in some instances be arrived at in course of time.

Prognosis is necessarily serious in cases of scirrhus of the pancreas, the disease being fatal, and seldom of long duration.

Treatment must be entirely symptomatic, directed especially against pain, vomiting, jaundice, loss of flesh and strength, anæmia, and debility. —FREDERICK T. ROBERTS.

PANNUS—*See Cornea, Diseases of.*

PANTOPHOBIA—*See Fear, Morbid*

PAPILLOMATA—*See Tumors.*

PARACENTESIS ABDOMINIS.—*Position of Patient.*—On side near edge of bed. An ink-mark may be made exactly in median line, midway between umbilicus and pubes, as patient lies on his back before turning him on his side.

Preparation.—Ascertain by percussion presence of fluid in spot to be pierced. Bladder should be empty. Apply a broad flannel belt round abdomen with its ends behind held by an assistant, who keeps up gentle pressure while the fluid flows, and finally secures it. The tapping may be done through a hole in it. Use a canula with an India-rubber tube leading into a bucket. Have ready strapping and pad of lint to apply after operation. Incise skin at point where the trocar is to be thrust in.

Dangers.—(1) Hæmorrhage, from not keeping to the middle line; (2) wound of bladder, from not emptying it; (3) wound of bowel, from not tapping in a thoroughly dull spot, or from plunging trocar in too deeply; (4) fainting.—C. B. KEETLEY.

PARACENTESIS PERICARDII.—An operation of extreme delicacy. Use the aspirator.

Place of Puncture.—Fifth intercostal space, two inches from sternum. Mark spot with ink. Use No. 1 or 2 Dieulafoy's needle. Aspirator cock must be turned as soon as needle-point is beneath skin, so that fluid may rush through needle the moment pericardium is opened. Direct needle upwards and inwards, and hold it perfectly steady.

PARACENTESIS THORACIS.—Formerly done with common trocar and canula; now usually with an aspirator. *Position of Patient*, sitting up in bed.

Preparations.—Ascertain by percussion, etc., presence of fluid. Place taps of aspirator in proper position.

Place of Puncture.—Fifth intercostal space in mid-axillary line, or a lower space more posteriorly, *e. g.*, seventh, near angle of scapula. Both may be tried if fluid does not come through the first.

Operation.—Puncture skin with a lancet. Insinuate aspirator needle with a twisting motion over lower ribs close to it (because intercostal artery is near upper rib). Then plunge needle smartly through pleura; turn cock of aspirator and collect fluid. Whether it is or is not such a serious matter to admit air into the pleural cavity has been the subject of many papers and speeches. For references, *see Neale's Medical Digest*, p. 240.

Dangers.—Wounding (1) intercostal vessels, (2) lung, (3) diaphragm, (4) admission of air and consequent collapse of lung, empyema, etc. (?) (5) rupture of pleura or capillaries by excessive suction with the aspirator, (6) sudden death (*see Medical Times*, vol. ii., 1875, p. 382, etc.) If it is desired to make a free incision, this is easily done by cutting along a grooved needle used as a director. Keep close to rib below the space. A counter-opening can be made either in the same way as the first, or by the help of a long bent probe or director inserted to be cut down upon.—C. B. KEETLEY.

PARALYSIS.—*Natural History.*—Palsy or paralysis are terms commonly restricted to affections where voluntary motion is lost, in which the motor fibres are no longer acted upon by volition (*acinesis*), while the term anæsthesia implies a palsy of the nerves of sensation. The various forms of palsy, or paralysis, are rather symptoms of a lesion than specific diseases. Palsy of a part is a very constant symptom of structural disease of the brain or of the spinal cord, but it occasionally occurs from a diseased state of a nerve-trunk itself. Palsy may affect a whole limb, or merely a part of one, and it is also limited to the muscles of certain regions. Palsy of a finger, a hand, an arm, or a leg, is an example of the first; palsy of the facial muscles of expression, from disease connected with the portio dura of the seventh pair or facial nerve, is an example of the second.

The following conditions give rise to paralysis of motion:—(1.) Lesion of a nerve in some part of its course destroying its power of transmitting that force, which is expressed by a contraction of the muscle into which the nerve is distributed. (2.) A lesion of some portion of those central parts of the nervous system whence the nerve takes its origin, or with which it may be connected directly or indirectly. And whatever interferes materially with the conducting power of nerve-fibre, or the generating power of nerve-vesicle, will constitute a paralyzing lesion. Poisoning of the nervous matter will operate in this way. Chloroform, ether, opium, the poison of lead and of mercury, applied directly to the nerve-fibre of a living animal, suspends its power of transmitting the nervous force so long as the influence of the poison lasts. Poisons formed or retained in the living body operate in the same way, such as the retained urinary or biliary principles, as in Bright's disease, the poisons of rheumatism, gout, and probably also syphilis in some of its more severe tertiary effects. Whatever, in short, impairs the natural structure of the nerve-matter, such as inflammation, atrophy, condensation, softening (spinal, as in the form of tabes dorsalis), solution of continuity, either by simply cutting the trunk of a nerve, or by the deliquescence of the nerve-fibres, as a result of disease, such as white softening, a sanguineous (spinal apoplexy) or serous effusion, pressure on a nerve or a nervous centre, are causes which will produce more or less complete paralysis of motion.

Four different conditions of the muscles are to be observed in cases of paralysis, namely,—(1.) A condition little different from that of health, but less firm, less excitable by the galvanic stimulus, when the paralyzing lesion is not of an irritative kind. (2.) Complete relaxation of the muscles, characterized by softness, imperfect nourishment, and rapid wasting—so rapid, that in a few days the size of the limb experiences a marked diminution. Such muscles scarcely, if at all, respond to the galvanic stimulus. (3.) Contraction of the muscles, with rigidity and wasting (the flexors being always more rigid than the extensors)—a condition which is due to a chronic shortening of the muscles themselves, and generally associated with a form of muscular atrophy. (4.) Nutrition not impaired, constant firmness and rigidity, incomplete paralysis, and with increased susceptibility to galvanic stimulus.

The practical inferences to be drawn from these conditions are of great value in treatment. Thus, early rigidity and its continuance indicate local bleeding or counter-irritation, while complete relaxation is against antiphlogistic treatment.

The different forms of paralysis of common occurrence are due—(1.) To disease of the brain or spinal cord, in which form the muscles may be rigid or relaxed, the disease of the brain being the result of apoplexy, minute hæmorrhages, softening, renal disease, induration—the result of syphilitic poison; the epileptic or choreic state; (2.) To pressure upon or injury to a nerve; (3.) To hysteria; (4.) To the influence of poisons, such *as lead*, arsenic, mercury, and some kinds of food-grains in a diseased *state*, *such* as lathyrus sativus.

Typical forms of paralysis are represented by:—

(1.) Paralysis of the insane or general paralysis; (2.) hemiplegia; (3.) paraplegia; (4.) locomotor ataxy; (5). wasting palsy, or progressive forms of paralysis; (6.) infantile paralysis; (7.) local paralysis—*e. g.*, (a.) facial palsy, and (b.) Scrivener's palsy; (8.) paralysis from blood-poisons; (9.) paralysis from lead-poisoning, or other poisons in food or drink, or from specific disease, such as diphtheritic paralysis; (10.) paralysis from lathyrus sativus.—WILLIAM AITKEN.

PARALYSIS AGITANS—*See Shaking Palsy.*

PARALYSIS, General—*See Paralysis of the Insane.*

PARALYSIS, Glosso-Laryngeal
PARALYSIS, Glosso-Pharyngeal } *See Paralysis, Local.*

PARALYSIS, Infantile.—Although Ollivier's large and important work on diseases of the spinal cord appeared as long ago as 1824, yet it may be truly said that a more precise knowledge of the affections to which that organ is liable, is of very recent date; and there are now few departments of pathology in which so much remains to be accomplished as in the one to which I purpose to draw attention in this paper. Indeed, the more we have come to know of it, the more abundant appears the crop of fresh problems which spring up at every step, and for which we are as yet totally unable to offer a satisfactory solution. With regard to the functions of the cord in health, there was more agreement amongst physiologists thirty years ago than there is at the present day. It is true that we are now much better acquainted with certain functions of the gray matter in the centre of the cord, and of the white posterior columns, than was formerly the case; yet we seem, after a number of ingenious experimental investigations, more in the dark than ever concerning the function of the white anterior columns. Again, while Pfluger has, by most able researches and acute reasoning, attempted to vindicate for the upper portion of the cord, certain functions which we have hitherto been in the habit of looking upon as purely cerebral or mental, Goltz has in almost as masterly a manner gainsaid all these conclusions. Much, no doubt, is known about the cord as a centre of sensation, motion, reflex action, co-ordination, and its influence on the movements of the bladder, rectum, and the male and female organs of generation; yet we are still unacquainted with the mode of its action on the various secretions, more especially of the salivary glands, the womb, ovaries, kidneys, and testicles, to all of which the cord appears to have an intimate relation.

The same considerations apply to the department of normal and pathological histology of the cord, on which so much light has been shed by the researches of Lockhart Clarke, Deiters, Frommann, Charcot, and others; for even at the present moment so elementary and important a question as that of the intimate structure of the neuroglia, or cementing tissue of the nervous matter in health, is in dispute. Since Virchow's researches on this point were first made known, the microscopical characters of the neuroglia have been a favorite subject of study on the part of the foremost microscopists in Germany, England and France; and according to Boll's most recent researches it appears to consist of multipolar connective tissue cells, with numberless fine processes and nuclei. If we turn to pathological histology, there is as yet much divergence of opinion as to what should be considered inflammation, and what, on the other hand, secondary degeneration, arising not from an irritating process, but from failure of the nutritive or trophic action of the nerve-cells on the nerve-fibres. Certain pathological appearances, such as softening, disintegration, varicose nerve-sheaths, etc., may be artificially produced by post-mortem changes, unless the specimens be kept in an ice-chamber, or at least at a temperature very little above freezing-point; and the very application of chromic acid, intended for the preservation of the parts, has sometimes led to errors when the solution used was too strong, in consequence of which the peripheral portions of the specimens hardened too rapidly, and became a barrier against the further penetration of the acid, leaving the central parts unaffected, and therefore liable to decomposition.

In experimental pathology, some good and suggestive work has been done, and which promises, if continued and enlarged, to give us a clearer insight into the mode of production of the structural changes which occur in diseases of the cord. Myelitis was first experimentally produced by Hayem and Liouville, who injected a solution of iodine in glycerine into the substance of the organ. Leyden subsequently employed for the same purpose, the liquor arsenicalis of the pharmacopœia, of which he injected from ten to twenty drops. This produced a hyper-acute purulent inflammation, resulting in extensive softening and suppuration, with effusion of blood into the tissue of the cord and beneath its membranes. In some cases, the whole marrow at and near the place of injection was changed into pus, to the extent of an inch and even more, while at other times small abscesses were found in the midst of softened matter. Microscopically, the first signs were swelling of the nuclei of the neuroglia, the nerve-fibres and cylinders-axis, all of which subsequently perished. The inflammation proved to be most severe at and near the place of injection, but was seen to spread considerably beyond it, both upwards and downwards, and to diminish in intensity as the distance increased. In the more remote parts there was no longer any suppuration, but the ordinary signs of acute myelitis presented themselves, viz., red and yellow softening, corresponding microscopically to dilatation of the arterioles and small veins, rupture of the capillary vessels with effusion of blood, swelling of the fibres of the neuroglia, nerve-fibres, cylinders-axis and ganglionic cells, and subsequent fatty degeneration and absorption of the whole mass. At a further distance from the place of injection, small disseminated areas of inflammation, without softening, and recognizable by the microscope only, were discovered. The general result of these experiments was therefore that myelitis is essentially the same disease, whether it leads to suppuration, softening or slight disintegration, and that it only varies in degree of intensity.

Dr. Hamilton has worked at the same subject in the laboratory of Professor Stricker, of Vienna, but employed a somewhat less violent method than Leyden. Having laid the cord of narcotized cats bare in the upper lumbar region, he passed a thread through the organ for about an inch longitudinally, tied the ends, closed the wound, and then left the animals for forty-eight hours so as to allow inflammation to become established. On examining the cord after death, the tissue was found to be mechanically broken down, and blood extravasated, at the seat of the lesion caused by the thread. The true inflammatory area, however, was not there, but at some distance from it in the surrounding parts. In some cases the whole extent of the transverse section of the cord was inflamed, but generally the change was most marked in the anterior columns. The microscope showed that the nerve-sheaths had undergone distension and attenuation; the axis-cylinders were swollen and divided, colloid bodies being formed from them, which were subsequently transformed into pus-corpuscles. The nerve-cells had undergone œdematous degeneration, the cell-substance having been converted into a molecular mass, in which the nucleus remained visible for some time, but finally likewise passed through a similar change. The neuroglia was not so much altered as might have been expected, yet in many places its protoplasmic nuclei were seen to be much more abundant than they are in sections taken from the normal portions of the same cord.

Feinberg has experimentally produced myelitis in a rabbit, by plying it hind legs, which were shaved, with ether spray for half an hour. The animal became anæsthetic and paralyzed, and continued in that condition for about two hours, after which time it recovered. Six weeks afterwards, however, myelitis was developed, which proved fatal. Myelitis could also be produced by cauterizing the sciatic nerve with a stick of potash. All the animals thus experimented upon died within a month of the operation. The parts between the place of cauterization and the cord were found in their normal condition; the membranes were likewise healthy, but the substance of the cord, more especially the central gray matter, was softened. Irritation of peripheral nerves may, therefore, be transmitted to the cord, without inflammation of the intervening structures, and it is probable that this influence is exercised by means of the vaso-motor system of nerves, causing at first contraction, and afterwards paralytic dilatation of the blood-vessels.

While it therefore appears, from the instances to which I have just drawn attention, that our knowledge in all the differen branches of this subject is still fragmentary, yet no one who has watched the scientific movement of the last few years can deny that great progress towards a better comprehension of it has been made; and I now purpose to show how far this holds good for that important portion of the spinal cord which is known as the anterior cornua of the gray matter.

The anterior horns are those broad and rounded processes of the central gray matter from where the anterior or motor roots of the spinal nerves emerge; while the posterior horns are those more pointed and attenuated processes from where the posterior or sentient roots originate. A central band unites the anterior with the posterior cornua forming the gelatinous substance of Rolando, while Clarke's vesicular columns are situated on the boundary line between anterior and posterior horns, in the dorsal portion of the cord.

The intimate structure of the anterior cornua is now tolerably well ascertained. Their chief histological elements consist of multipolar ganglion cells of considerable size, some of which are visible to the naked eye, when the cord has been treated with a solution of carmine, as small points of a bright red color, carmine having the property first pointed out by Lockhart Clarke, of coloring only the ganglionic cells with their processes, and the neuroglia, but not the nerve-fibres, which cannot absorb the coloring material. The cells of the posterior horns are much smaller, and can only be recognized by employing magnifying power; while cells of intermediate size between the two are found in Clarke's vesicular columns. These cells lie in the gray matter in peculiarly arranged groups, of which Goll has distinguished as many as twelve, while Kölliker and Leyden assume only five. No doubt the arrangement and grouping of these ganglionic masses is intimately connected with difference of function. Osjannikoff and Jacubowitsch have endeavored to prove that the large anterior cells are strictly motor, the smaller vesicular ones of Clarke's columns sentient, and the smallest posterior ones sympathetic or vaso-motor; while Duchenne and Joffroy consider that only a portion of the anterior cells are motor, and another portion of them trophic, that is, regulating the nutrition of the parts under their influence—a hypothesis which is largely supported by facts in pathological histology and clinical medicine.

In some portions of the cord, the ganglion cells are much more numerous than in others. Thus Goll found 140 in that part of the anterior horns which corresponds to the cervical enlargement at the exit of the sixth cervical nerve, where this assumes its greatest development; seventy-seven in the part corresponding to the fourth; forty-two in that answering to the third; thirty-eight corresponding to the eighth; and twenty-eight in that nearest the first cervical nerve. These cells are again very numerous in the lumbar enlargement of the organ, but scanty in its dorsal portion. In fact both the cervical and lumbar enlargements consist almost exclusively of an accumulation of gray matter in the anterior horns.

The cells enclose a large nucleus with a bright nucleolus, and heaps of pigmentary granules. Their shape is angular, stellated, or spindle-like. Deiters has discovered that two different kinds of processes branch off from these cells, viz., firstly, numerous so-called protoplasmic processes, which radiate and ramify in all directions, and ultimately form a very fine network; and secondly, one single so-called nerve-process, or cylinder-axis, which is distinguished from the protoplasmic processes by its darker and better defined contours, and its greater resistance to test solutions. The nerve-process does not ramify like the others, but remains undivided, and after proceeding for some distance becomes surrounded with a sheath, and is changed into a nerve-fibre, which has in many instances been followed up into the anterior nerve-roots, to the fibres of which it becomes adjoined.

The number of protoplasmic processes varies. Where they are numerous, the cells are called multipolar; where there are only two, we speak of bipolar cells; but the so-called apolar cell, without any process, is now generally considered to be an artificial production, owing to the processes having been destroyed in preparing the specimens. The processes being assumed to propagate and transmit the nerve-force engendered in the cells, an apolar cell would indeed have no *raison d'etre.*

Next to the cells, we find in the gray matter very fine nerve-fibres, some of which contain myeline, and others not. Those containing that substance are a good deal finer than the corresponding fibres in the white matter of the posterior and antero-lateral columns of the cord; while such as are without myeline belong exclusively to the gray matter, in which they form a very fine net-work, within which the finest nerve-fibres communicate most abundantly with the protoplasmic processes of the cells; cells and fibres being surrounded, and, as it were, cemented by the neuroglia.

While carmine colors the cells and neuroglia, but leaves the fibres unaltered, chromic acid and its congeners harden the parts, so that it becomes easy to make sections, and likewise allow us to distinguish at a glance healthy from diseased tissue, since the former assumes a dark yellow color, while the latter remains light. The first to suggest the use of chromic acid for this purpose was Prof. Hannover, of Copenhagen; Lockhart Clarke afterwards substituted bichromate of potash for it, while Gerlach prefers bichromate of ammonia. For rendering the specimens transparent, glycerine, oil of cloves, benzine, turpentine and creosote are generally employed.

Clinically, the principal diseases in which the characteristic lesion may, during life, be supposed, and is after death discovered, in the anterior cornua, are infantile paralysis, certain forms of paraplegia, without simultaneous loss of sensation, and coming on either suddenly or gradually, and progressive muscular atrophy.

1. INFANTILE PARALYSIS.—Infantile paralysis is produced by a diffuse acute inflammation of the anterior horns, which is generally most intense in the cervical or lumbar enlargement, but may also affect the dorsal portion of the cord. It proves but rarely fatal within a few days or weeks from its invasion. Occasionally there may be no general symptoms at all, but the child is put to bed apparently in perfect health, is found next morning paralyzed in a limb or part of a limb, and ails otherwise nothing at all. This mostly occurs in hearty, well-developed children, whose nervous system has already some power of resistance, and where the inflammation occupies only a small area, so as to cause paralysis limited to part of a limb,

or only some sets of muscles. In a much larger number of cases, however, there is a good deal of constitutional disturbance, viz., high fever preceded by general malaise loss of appetite, and pain in the head, as evidenced by screaming, and by the child pressing the head into the pillow. One or several fits of eclampsia then take place, after which the paralysis is noticed. This latter does not occur as quickly as in apoplexy from cerebral hæmorrhage, but nevertheless very rapidly; it mostly reaches its maximum within a few hours, and has no progressive character whatever. The fever abates after a time, and the general condition becomes satisfactory, but the paralysis remains. In exceptional cases there are several attacks of it, so that first one limb is paralyzed, after which the child appears to improve, but relapses a few days afterwards into a feverish state, when another limb is found affected, etc. A fatal termination of the illness is exceedingly rare and there are no post mortem records where the child has not been paralyzed for at least two months; yet I believe that certain cases of infantile eclampsia, which proves so largely fatal to children, are really instances of severe inflammation of the anterior cornua of the cord, more especially when occurring in weak and sickly children, and when affecting the entire extent of the cord. In such cases the principal symptoms are a succession of convulsive seizures, and hyperpyrexia; the child appears paralyzed after the fits, sinks into a comatose condition, and dies from asphyxia or exhaustion of the nervous centres.

In cases which have proved fatal within a few months from the invasion of the disease, simple inspection of the cord by the naked eye teaches us little or nothing. Rillet and Barthez, the authors of the most able and comprehensive work on the diseases of children, were thus led to express the opinion that there was no distinctive anatomical lesion connected with infantile paralysis. In Germany, however, Heine, who was extremely familiar with these cases from having watched large numbers of them in the orthopædic institution with which he was connected, was by clinical observation led to the view that the disease was of spinal origin. The first microscopical observations of specimens of the cord were made by Cornil, Prevost, and Vulpian, to which were soon afterwards added those of Lockhart Clarke, Charcot, Joffroy, and many others. The general result which has thus been obtained is that infantile paralysis is an extremely acute myelitis of moderate intensity, which is either diffuse or occurs in circumscribed areas, and affects more particularly the cervical and lumbar enlargements of the cord. The inflammation being generally confined to the anterior gray matter, Kussmaul has proposed to call the disease anterior polio-myelitis, from *polios*, gray, and *muelos*, marrow; and as this term appears to be a very appropriate one, I propose to adopt it.

The right leg being most frequently the seat of infantile paralysis, the right anterior horn of the lumbar enlargement is chiefly subject to this inflammation. Where only one limb suffers, we speak of monoplegia; but there may also be hemiplegia, paraplegia and crossed paralysis, in which latter form the arm of one side and the leg of the opposite side are affected. The paralysis is, however, not necessarily confined to the limbs, but may affect the body, more especially the muscles of the back; in such cases we find that the children are unable to sit up; they are apt to fall forwards, more rarely backwards, and the spine assumes a more or less considerable degree of curvature. There is never any affection of the head or of the cranial nerves, which renders it evident that the disease is confined to the spinal cord, and does not proceed as high up as the medulla oblongata. Where the muscles of the body have been paralyzed during life, changes in the dorsal cord are discovered post-mortem, while, where the extremities had suffered, the cervical and lumbar enlargements are found diseased.

The question whether polio-myelitis affects primarily the ganglionic cells of the anterior cornua, or whether the neuroglia, or interstitial cementing tissue, is first affected, and softening and atrophy of the ganglionic cells is subsequent thereon—in other words, whether polio-myelitis is parenchymatous or interstitial—is not yet settled. Charcot and others support the former view, while Roth and others are in favor of the latter. Dujardin, however, has rendered it probable that both tissues become inflamed at the same time, and that the myelitis is therefore parenchymatous as well as interstitial. The microscope shows indeed the whole structure to be inflamed; the large multipolar cells, together with the nerve-fibres and cylinders-axis are more or less extensively destroyed; there is proliferation of nuclei, and connective tissue, and hyperæmia of the blood-vessels. The neighboring tissues are generally normal, as the inflammation has no tendency to spread either to the posterior cornua, or to the antero-lateral columns; and it is only in cases where there have been complications during life, and where the true clinical aspect of infantile paralysis has therefore been somewhat obscured, that changes in other portions of the organ have been discovered.

I have said that death at an early period of infantile paralysis is exceedingly rare; and most cases, therefore, which have been ultimately examined on the post-mortem table have proved fatal at much later periods of life, owing to incidental diseases which had no connection with the palsy. One case is on record where the autopsy took place upwards of sixty years after the occurrence of the paralysis. In such instances, the post-mortem appearances are of course somewhat different from those which obtain in recent cases; but the general result is the same. The naked eye perceives a wasting of the anterior cornua; the antero-lateral columns are smaller than in health, but the posterior cornua and columns are unaffected. If specimens of the diseased parts are microscopically examined, it is seen that in lieu of the cells and fibres which constitute the principal parts of the anterior horns in health, there is connective tissue of various periods of age, some young and soft, some tough and old, while amyloid corpuscles, which are rarely absent in old destructive lesions of the cord, are found in considerable quantities. If any cells are left, they are seen to be in different stages of shrinking and disintegration. Clarke's vesicular columns are generally in their normal state. The peripheral nerves which have been paralyzed during life, are wasted, and the connective tissue and nuclei appear increased. The muscles are in a state of degenerative atrophy. At an earlier stage of the complaint they appear pale, soft and attenuated; the primitive fibres are small, the stripes indistinct, the nuclei proliferated, the interstitial tissue hypertrophied, and the blood-vessels thickened. Later on the muscles assume a grayish tinge, and the fibres are interspersed with whitish connective tissue and layers of yellow fat. Ultimately the quantity of fat which is deposited, may become so abundant that the entire muscle is replaced by it, and there may be actually more bulk than there would be if the muscle were in its proper condition. Other portions of the muscles may undergo a kind of fibrous sclerosis, without development of adipose tissue. The tendons are smaller and thinner than in health; the bones are shorter and narrower; their protuberances are not properly developed, the cortex is thin and fragile, the medullary layer enlarged, the marrow more abundant. The joints are relaxed, the ligaments loose and flabby, the cartilages attenuated. The arteries are somewhat wasted, but the skin over these parts is generally normal.

Anterior polio-myelitis of children is distinguished from other forms of spinal paralysis by there being no affection of sensibility, which remains *perfectly* normal; no paralysis of the sphincters, which continue to act *properly* throughout the course of the disease; and no tendency to decubitus. It is true that some of these little patients suffer from nocturnal enuresis, but there is no real incontinence of urine. It is therefore exclusively motor paralysis, followed by muscular atrophy, to which is frequently added contraction and deformity.

The mere existence of the paralysis is easily recognized, without having recourse to the more minute methods of examination which are necessary for determining the exact condition of the paralyzed parts. A limb, or portion of the limb, or several limbs, remain motionless when the rest of the body is moved about. The affected limb is flabby and loose, it dangles about, slips away, does not resist passive movements which are impressed upon it, and assumes any position which is given to it by gravitation. The muscles feel flabby to the hand, and this increases within the next few weeks, as wasting of the muscular substance, which is no longer connected with its centre of nutrition, sets in and becomes more or less fully established. The joints become so loose that incomplete dislocation is frequently produced. The wasting of the muscles is sometimes hidden from the eye or the hand by a considerable accumulation of fat, more especially in the thigh, while it is more easily recognized in the shoulder, arm, and leg. The ends of the extremities, such as the knees, toes, fingers and elbows, may be slightly cyanotic, somewhat swollen, and one or two degrees colder than the corresponding ones of the other side; and they are generally covered by a cold clammy perspiration, which is absent from the healthy limbs.

The exact state of the nerves and muscles can, during life, only be recognized by using electricity; and for this purpose both forms of current, the induced or faradic, and the continuous or voltaic currents are necessary, as the nerves and muscles respond to both forms of current in a different manner; and from the way in which the response takes place, conclusions may be drawn as to the more or less altered condition of the nerves and muscles. The induced or faradic current should be applied first to the motor nerves, when we speak of indirect muscular faradization; and secondly, to the tissue of the muscles themselves, which is called direct muscular faradization. In the former of these two modes, the negative pole or cathode which has a more powerful influence than the positive pole or anode, is applied to the motor nerve, while the other pole is placed to some point at a distance, for which the sternum generally is chosen. In health, such a proceeding causes contractions of all the muscles which are under the influence of the motor nerve that is faradized. The degree of these contractions varies according to the force of the current used, so that a feeble power causes slight, a moderate force moderate contractions, while a powerful current produces true tetanus of the muscles. This effect of the induced current is entirely independent of the will of the person experimented upon, and irresistible, provided a current of some power is used. Direct muscular faradization is performed by placing both electrodes on the belly of the muscle which is to be examined and is quite local in its effects.

Where infantile paralysis is complete, and has lasted for some time, we find that this faradic response of the muscles is totally absent, even where a considerable force of current is employed, and whether we use direct or indirect muscular faradization. The muscle appears completely dead and unexcitable to this form of electricity; while in other forms of paralysis, more especially in hemiplegia from cerebral hæmorrhage, or from softening by embolism and thrombosis, the paralyzed muscles generally respond equally well to faradization as the healthy ones, and continue to do so for years after the paralysis has become established. We may, therefore, by *this means alone distinguish* infantile paralysis from cerebral palsy. Where *the loss of power is incomplete,* the faradic excitability of the muscles is not entirely gone, but more or less considerably diminished; and this can be accurately ascertained by comparing the corresponding muscles of the healthy limb with those of the paralyzed one, when it is seen that an electric force which is capable of producing a decided effect on the healthy muscles, will remain ineffectual in the diseased muscles, and that the force must be considerably increased before any effect in the latter is witnessed. Duchenne has shown that the faradic excitability of the nerves and muscles begins to diminish at a very early period of the disease, viz, on the third, fourth, or fifth day after the palsy has become established, and that it has completely vanished by the seventh day, or at the latest in the second week.

Where this loss of faradic excitability is complete, the muscles, unless specific treatment be immediately adopted, generally remain permanently paralyzed; while where there is only diminution but no absolute loss in the second week, the muscles may be expected to recover, and that the more rapidly and completely, the less this faradic excitability was diminished.

The continuous or voltaic current, when passing through a nerve or muscle for some time without opening or closing the circuit, produces no apparent effect, while any variation in the current, such as making or breaking it, will cause a muscular response. This latter takes place in a peculiar manner in the healthy subject, circumstances being somewhat more complicated than with faradism. With faradization the effect of the two poles is identical, except that the negative is more powerful than the positive; but with the continuous current there is not merely a difference in degree, but also in kind, as far as the two poles are concerned. In using it for the purpose of acertaining the condition of the nerves and muscles, the cathode and anode are alternately placed on the nerve, while tne other pole rests on the sternum, or some other place at a distance. The current is then alternately made and broken, when it is seen that the cathode acts chiefly on making, and the anode chiefly on breaking, and that the cathode is more powerful than the anode. Thus when a feeble current is used; there is only a response on making with the cathode, but no effect takes place on breaking with the cathode, nor whether we make or break it with the anode. When the force of the current is increased, the response on making with the cathode becomes more powerful; there is no effect on breaking with the same; but the anode causes slight contractions on making as well as on breaking, the latter effect being the more powerful one. Finally, with the highest degree of current force, there is strong tetanus on making with the cathode; a second somewhat more feeble effect on breaking with the anode, a third still weaker action on making with the anode, and a fourth extremely slight response on breaking with the cathode. The muscles respond to the continuous current in the same manner as the nerves, and any changes in the mode in which these voltaic responses take place are pathological, and give us valuable indications, not only as to the conditions of the paralyzed nerves and muscles, but also for the diagnosis, prognosis, and treatment of the affection we have to deal with.

That the voltaic excitability of the nerves and muscles is altered in infantile paralysis, was first shown by Salomon, and has since then been frequently noticed by a number of competent observers. Here a curious fact presents itself, which has long been known with regard to peripheral paralysis of the motor nerves, viz., that nerves and muscles obey totally different laws as far as the voltaic influence is concerned. The nerves lose voltaic excitability in the same ratio and degree as they lose their faradic response, that is to say, there is a diminution within the first few days, and total abolition in the second week. With the muscles, however, the case is entirely different; for while during the first week the voltaic response diminishes proportionately to the faradic excitability, it begins to rise in the second week, and then becomes exalted beyond the normal standard, so that the paralyzed muscles are seen to answer to a current so feeble as to be absolutely ineffectual when applied to healthy muscles. Thus I have repeatedly seen that, when the healthy muscles responded only to twenty-five or thirty pairs of the battery, the paralyzed ones answered to ten or fifteen pairs. Apart from this, however, the character of the response is altered. For while the healthy muscle gives a quick and short response, and that only on making and breaking, but not while the circuit remains closed, the paralyzed one answers sluggishly, in a drawling manner, and remains in a kind of continuous contraction during the whole time that the current continues to act. The normal response to the positive and negative pole is likewise altered, so that the cathode, which generally predominates over the anode, loses, and the anode gains, in influence; we find therefore that the effect of making with the anode becomes stronger than that of making with the cathode. At the same time the effect of breaking with the cathode, which in health is of the very slightest, is increased, so that it becomes after a time equal or even superior to breaking with the anode. This condition continues for about a month, or more, after which the response on making with both poles disappears; and this is then gradually succeeded by a decided fall in the galvano-muscular response altogether. This fall continues, so that in order to obtain any response at all, the current-force has to be considerably increased, two or three months after the commencement of the palsy. Ultimately any degree of voltaic power which it is possible to use, produces either no effect at all or only a very slight one, on making with the cathode. Even in cases where, ultimately, recovery takes place, galvano-muscular excitability continues feeble for a considerable time, and the recovery of volitional power begins not unfrequently at a time when both faradization and galvanization are still quite, or at least nearly, ineffectual. Some years after the paralysis has become established, the voltaic current is the only means of showing that muscular tissue is still in existence, a sluggish response being obtained by a considerable degree of galvanic force, principally on making with the cathode.

I cannot in this place enter into a full explanation of the singular and interesting phenomena which I have just described; suffice it to say that they are to a great extent accounted for by the differences in the duration of the currents which are used in these investigations. The shorter the duration, the less is the effect. This is the reason why faradism, which consists of a very quick succession of instantaneous currents, has no effect at all; and the voltaic current likewise is more effectual in proportion to the length of its action. A feeble voltaic current, which acts for a considerable time, has for this reason more effect than a powerful one which acts only for an instant. Pathologically the phenomena which I have just described, correspond closely to those degenerative changes which are going on in the nerves and muscles, when these have been separated from their nutritive centres in the cornua of the cord; and it is thus shown that destruction of these centres has the same effect on the nerves and muscles which are under their influence, as is produced by a break in the continuity between the centre and the peripheral nerve, as, for instance, in peripheral paralysis owing to injury of the nerve. It is, therefore, no longer true, as was formerly believed, that the presence of the galvano and faradomuscular phenomena just described, was characteristic for peripheral paralysis; but the conclusion is inevitable that when they present themselves, we have to do either with destruction of the nutritive centres, or with separation of the peripheral parts from these centres; and the diagnosis between separation and destruction cannot be made by electricity.

but must be arrived at by a consideration of the general clinical features of the cases under examination. For the electrical phenomena just described, I propose the term of "wasting-test."

II. ANTERIOR MYELITIS OF ADULTS.—Does infantile paralysis ever occur in adults? This might by some be considered a Hibernian question, but it is one which has often occupied the attention of pathologists. Some observers have denied that it occurs after eleven years of age, while a number of others have described cases of myelitis and of post-febrile paralysis in adults, which show the greatest possible analogy with infantile paralysis. As such cases are not very common, I will now give the details of two such, which are at present under my care. In one of them the disease affected the anterior horns of the lumbar, and in the other the same portion of the cervical enlargement.

The first of these patients was an officer in the army, aged 31, single, of healthy parents and temperate habits. He had entered the army in 1864, had from that time until 1869 been stationed in the northern provinces of India, and afterwards at various places in England. In 1874 he was sent to Malta, where he remained three years. At that time he was in the habit of taking violent exercise, as he found himself getting stout. He used to ride much on horseback, and played at rackets for two or three hours daily, which threw him into a violent perspiration. On June 25th, 1877, he was out taking exercise in a very powerful sun, and towards evening took a bath in the sea. The water felt very chilly to him, but he nevertheless remained about three-quarters of an hour in it, sometimes standing about on the shore, and then getting back into the water. On coming out at last, he felt benumbed, and had acute pain in the small of the back, and the legs; he could not recline nor sit still for even a few minutes, and felt so restless that he did not sleep at all, but kept walking about in his rooms all night. Hot fomentations relieved the pain, but only for a short time, and he was much exhausted in the morning. On the second day the pain was not so acute; he could walk about without assistance, but the back felt stiff, and the legs ached. Towards evening of the same day he could not walk so well; he had to hold on to the shoulders of two brother-officers, and the right leg dragged. He could pass his water without difficulty. There was loss of appetite; he only took a little soup. Hot sponging relieved him, and made the limbs feel easier for a short time. At night he had an opiate, and slept for sixteen hours consecutively, perspiring profusely all the time.

On awaking on the morning of the third day, he felt exhausted, and found that his legs had become entirely powerless from the hips downwards; he could only move them with his hands; the acute pain was gone, a dull aching only being felt. The back and loins felt very stiff, and he could not turn over in bed, showing paralysis of the muscles of the loins. The legs were tender to the touch, and felt sore when handled. He had to strain a little in passing his water, and the bowels were confined. The loss of appetite continued. The patient was now blistered and leeched in the back. The temperature, which had previously not been taken, was now found to be 1048, with the thermometer placed under the tongue. The next night he slept a little, the restlessness being relieved by his position being shifted frequently. There was no feeling of tightness round the lower portion of the body, nor any loss of sensation.

On the fourth day there was no acute pain, but the dull aching in the back and legs continued. The patient was put into an easy chair and felt better. The bowels were relieved by an enema, and the water was passed after some delay, the stream appearing fairly strong. The appetite was improved, the temperature 103°. The day and night registrations of the thermometer varied but little. The legs were rubbed, which made them comfortable, and they became red under the friction. There was no priapism at this or at any other time.

The succeeding days were much the same. The thermometer gradually went down to 101°, and remained at this figure for three weeks more. The general condition improved, the bowels acted regularly, and the water could be passed at all times. The appetite was better, and the patient slept longer without requiring to have his position changed so often, being easier on the back than on the side. He generally spent the day sitting in an easy-chair, which did not fatigue him. The legs, however, now began to waste considerably.

In about three weeks the temperature had fallen to 98°, and the patient was then given solid food. The general condition was now satisfactory, and he began to move the toes of the left foot a little. Strychnia was injected subcutaneously in the inner part of the thighs, and rubbing and magneto-electricity were used for about a fortnight. He was invalided in the commencement of September, and left Malta. He went to Guernsey, where he was treated with strychnia three times daily, and the continuous current; with the effect that the muscles developed better and became firmer; and in December last he came to London to place himself under my care.

On examining him on December 13th, I found that there was complete paralysis of motion in both lower extremities, from the hips downwards. The muscles of the loins were not paralyzed, as the patient had no difficulty in turning over in bed; but there was no movement whatever in the ankle-joints, the knees and the hips, while the toes of the left foot could be slightly flexed. The wasting-test was well marked. Faradization of the nerves and muscles of the lower extremities did not produce any response at all, even if the power of the current was increased to the maximum strength given by the double-celled coil of Stohrer's apparatus, and which caused an almost intolerable sensation of pricking and burning; yet not the slightest fibrillary twitches occurred in any of the muscles acted upon, whether direct or indirect faradization was used. The continuous voltaic current had no influence on the nerves, but when applied directly to the muscular substance, caused sluggish contractions, more particularly in the left leg. Making with the anode had the most effect, making with the cathode less, and breaking with either poles was quite ineffectual. There was no muscular rigidity anywhere, all the muscles being completely flabby and relaxed, and offering no resistance to passive movements impressed upon them. They had a doughy feel, and as there was not much wasting in the limbs, a transformation of some portion of muscular tissue into fat could be assumed with a high degree of probability.

Sensation was perfectly normal, there being neither pain nor paræsthesia nor anæsthesia. Pressure on, and percussion of the spine did not show any tender points; a hot sponge could be carried along the back, without giving rise to a feeling of soreness; and faradization and galvanization of the spine showed it to be in its ordinary condition of sensibility. The senses of touch, of temperature, of locality, and all the other varieties of sensation in the lower extremities were likewise normal.

Reflex excitability, on the other hand, was completely abolished. Tickling the soles and the knees, and irritation of the inner surface of the thighs, was well perceived, but did not cause any movements in the paralyzed limbs. Percussion of the tendon of the rectus femoris and of the tendo Achillis, remained likewise ineffectual.

The temperature of the limbs was 94° to 95°. The skin was slightly moist, œdematous, and in parts mottled. There was no decubitus, nor had there ever been any sign of it. The sphincters were perfectly normal; the action of the bowels regular; the urine normal; nor was there any loss of expulsive power in the bladder. Sexual desire, however, which before the affection came on was keen, was lost, and no proper erections nor nocturnal emissions had occurred since the disease became developed. Digestion, respiration, and the heart's action were quite normal. There were no head symptoms.

On considering the peculiar features of the case, the diagnosis could not be doubtful. As only the motion of the lower extremities was lost, and sensation in them had not suffered; as there was no decubitus, and no affection of the bladder and rectum, the case was evidently one of acute poliomyelitis, or inflammation of the anterior cornua of the lumbar enlargement of the cord, which had led to paralysis and atrophy of the muscles of the lower extremities. The close analogy of the symptoms with those which are observed in the majority of cases of infantile paralysis, was very striking. There had been fever, the thermometer having run up to 104°, and remaining for more than three weeks above the normal average. There had, however, never been any head symptoms, which is explained by the circumstance that the brain of adults offers more resistance to morbid influences of that kind than that of children; and this is more particularly so, where the seat of the disease is at a considerable distance from the brain as in the lumbar enlargement. Where the upper portion of the cord is affected, cerebral symptoms may make their appearance in the adult, as I shall presently show by another case. In this instance there had only been general malaise, with pain and tenderness of the loins and lower extremities, restlessness, and complete loss of appetite. As is so well marked in infantile paralysis, the loss of power had set in rapidly, there having been paresis or incomplete paralysis on the second, and complete paralysis on the third day, with total relaxation of the muscles. From that time the state of motion had not perceptibly varied. The bladder was only to the very slightest extent affected on the third day of the disease, but rapidly recovered its full power. The fact that there was at no time any muscular rigidity, explains why no deformity worth speaking of took place. In the adult, deformity is altogether less likely to occur than in children, because the joints and ligaments are firmer, and the growth of the bones is finished at the time of the invasion of the disease; and deformities occur as a general rule only where one set of muscles is more paralyzed than another, or where one set has escaped the lesion altogether.

I now proceed to describe a case of acute anterior polio-myelitis affecting the *cervical* enlargement of the spinal cord.

M. M., a Scotch gentleman, aged thirty-four, single, of no regular occupation, came under my care in January, 1876, and gave me the following history:—

In November, 1864, being then an undergraduate at Edinburgh, in good health, and studying hard, he attended a crowded meeting in the music hall in that city, during which he prespired profusely. When he came out of doors, it was snowing, with a keen northerly wind blowing. He dined, and then walked out again for about an hour. Before returning home, he felt very chilly; two hours later he perceived pain and stiffness in the back of the neck, which increased when he attempted to move his head. He gradually became more chilly and drowsy, and tried hard to shake it off, so as to be enabled to study, but to no purpose. At bed time, the skin being hot and dry, he took some hot whisky and water, but continued feverish, and lay tossing about in bed all night, very restless, and unable to go to sleep. Next morning he got up and went to his class, but felt so drowsy and languid that he was obliged to return home. That afternoon he took a dose of Epsom salts, and having during the following night to traverse long windy passages to the closet, he took a second chill. The two following days he was up, but did not go out, as the excessive drowsiness and languor continued without abatement. During the night of the fourth day, he got out of bed for a drink, but after a few steps his knees gave way quite suddenly, and he fell heavily on his back. A friend with whom he was lodging, had to assist him to get up, and with some difficulty put him into bed. He now perceived a difficulty in passing his water, but ultimately succeeded in doing so. Next morning he found that he was entirely helpless, the paralysis having extended to both upper extremities. The left side of the body was now completely paralyzed, while on the right he could just move the fingers and toes a little. All this time there was no pain, nor loss of sensation, and the fever presently left him. The temperature was not taken at any time during the progress of the case. He was given antimonial wine, and fell into a profuse perspiration, which continued without intermission for about a fortnight. The drowsiness gradually left him, the head appeared quite unaffected, and the general health was good, for with the exception of the loss of power, he felt about a month after the commencement of the disease, as well as ever he did in his life. There was, however, complete paralysis of the left and nearly complete loss of power in the right side. He could not even move his head on the pillow and for six months was not taken out of bed.

There was never any tendency to decubitus. The condition of the bladder varied; the patient being sometimes unable to empty the viscus, so that the catheter had to be used; while generally he could pass his water, although with some difficulty. The urine would appear never to have undergone those changes which are so marked in transverse myelitis; viz., alkaline decomposition with formation of triple phosphates, vibriones, bacteria, and muco-pus; but it would seem to have been normal throughout the disease. The bowels were sluggish, purgatives had no effect, and enemata were found necessary. The treatment at this time consisted of blistering at the back of the neck, strychnia, and the use of the magneto-electric rotatory apparatus, which was kept grinding away in his hands, and sometimes at the soles of his feet—a most unscientific and foolish application—three times daily for half an hour. The electrodes were brass tubes without handles; the machine was used for two or three months, and the patient believed it did him more harm than good. He was very little better by May of the following year, and was then taken to his home in the Highlands, where he began to improve considerably, and had in a month recovered full power over the bladder and bowels. In June he went to the Strathpeffer sulphur springs, and derived apparently some benefit from them; for when he retutned, he could stand when put on his legs, and walk a few steps without assistance.

During the following years he pursued various plans of treatment, consisting more especially of different applications of electricity, arsenic, and hydropathy; and he gradually improved, without, however, being able to attribute any very decided result to any of them.

At the time he came under my care, more than eleven years after the commencement of the disease, there were no symptoms pointing to an affection of the brain or cerebral nerves. Sensation was perfect all over the body, and the general health was good. With regard to the state of motion in the upper extremities, the patient had to a great extent recovered the power over the right arm and hand, which he could move in all directions; he could write a letter, wash and dress himself, and squeezed the dynamometer to the extent of forty-eight kilogrammes. The muscles, although not robust, were fairly nourished, and responded tolerably well to faradization and galvanization. The left arm was much more feeble than the right; there was some wasting of the trapezius, deltoid and serratus muscles, causing slight dislocation of the caput humeri. The biceps was very feebly developed, and the flexor muscles of the forearm were also in a state of atrophy. The muscles of the ball of the thumb, and the first interosseous muscles were greatly wasted. In accordance with these symptoms, the patient had but little power in the left arm, which he could not raise above the horizontal line, and the hand was to a great extent useless and awkward. There was, however, a degree of faradic and galvanic response, which was in exact proportion to the general state of motion in, and nutrition of, the muscles. Relax excitability was normal in the right, and somewhat reduced in the left arm. With regard to the lower extremities, it was found that when once fairly on his feet, he could walk with the aid of a stick for about two hundred yards. After doing that distance, however, the back became painful, and the patient got out of breath, so that he was obliged to rest. With crutches he could walk several miles. He could stand for hours without fatigue, but was always worse after sitting for a long time. He had great difficulty in turning in bed, and in undressing, and was generally unwieldy. The left leg was much more powerless than the right, and there was much greater atrophy in the muscles of the left thigh and leg. Nevertheless, what was left of these muscles responded well to galvanization and faradization; and there was no lack of reflex excitability in the lower limbs, both as far as skin and tendons were concerned. Apart from the unsatisfactory state of motion, the patient was in perfect health in every respect.

From this description it will be seen that the two cases of anterior polio-myelitis which I have just described, were in most respects exceedingly similar. In both the cause was evidently cold, although it does appear singular that both patients had often before been exposed to chills on a heated body without having been any the worse for it. More especially the subject of the second case was brought up inured to hardihood, and could with perfect impunity endure severe and prolonged exposure to heat, wet and cold, and was in the habit of taking cold baths to an inordinate length; and even at the present time a thorough drenching and sitting in wet clothes would not affect him. It appears, therefore, probable that in both cases there must, at the time of the invasion of the disease, have been a state of diminished resistance of the cord to external unfavorable influences. Neither of the patients had the neurotic constitution; neither had had syphilis. In both there was fever and systemic disturbance at the commencement; in the former where the lumbar enlargement was affected, the head remained perfectly clear, there being only great restlessness; while in the latter, where the cervical enlargement suffered, there were, in addition to restlessness, great drowsiness and languor. In both there was profuse perspiration at an early period of the disease; the paralysis was quickly produced, and remaining exactly the same for a considerable time. Where the lumbar enlargement suffered, the bladder was hardly at all affected, while in the case of cervical polio-myelitis the bladder suffered, but recovered its tone at an early period.

There are indeed few diseases which could be confounded with acute anterior polio-myelitis. Hæmorrhage into the spinal cord may produce sudden paralysis, which is followed by atrophy and loss of reflex excitability; but there is an absence of fever, the invasion of the paralysis is still more sudden, as it generally comes on in a quarter of an hour, or even less; and there is anæsthesia, paralysis of the sphincters, and decubitus.

In acute central or transverse myelitis there is always anæsthesia of the skin, paralysis of the sphincters, and tendency to decubitus, by which that disease is sufficiently well distinguished from acute anterior myelitis.

Progressive muscular atrophy is very chronic in its invasion, and there is *wasting* of muscular tissue before the paralysis sets in. There are many other distinctive features between these two diseases, but the two I have just mentioned are quite sufficient for us to make a proper diagnosis.

Brown-Séquard's spinal hemiplegia or hemiparaplegia can hardly be confounded with anterior myelitis. It is true that there is motor paralysis affecting either the leg, alone, or the arm and leg of the same side; but while in polio-myelitis sensibility remains normal, there is in Brown-Sequard's disease hyperæsthesia on the paralyzed, and anæsthesia on the opposite side, which renders the diagnosis certain.

From cerebral hemiplegia anterior myelitis may be distinguished by the different commencement of the paralysis; by the affections of cerebral nerves which accompany cerebral paralysis; and particularly by the circumstance that in cerebral paralysis the farado-muscular excitability remains generally unaltered, or nearly so, even years after the invasion of the disease, while in polio-myelitis it is lost in the second week.

Paralysis from obstetric operations is noticed immediately after birth, while polio-myelitis occurs very rarely before the child is twelve months old. A not unfrequent form of obstetric paralysis is that affecting the portio dura, which is caused by pressure of the blade of the forceps on the parotid gland, and the pes anserinum. It generally disappears a few days after birth, but where the pressure was severe, it may persist during life. It only becomes of importance where that branch of the nerve is paralyzed which supplies the lips, as it may then interfere with sucking. In infantile paralysis, and anterior myelitis of the adult, the portio dura is never affected. The arm may also be paralyzed by pressure of the forceps on the brachial plexus, which then becomes compressed by an effusion of blood; and in such cases anæsthesia is combined with the paralysis. Pressure of the finger on the axilla, during the operation of turning, may likewise give rise to it, and cause at the same time dislocation of the caput humeri. Paralysis of the lower extremities may be produced by too forcible traction in turning, causing injury to the spinal cord. The combination with anæsthesia, and the appearance of the paralysis immediately after delivery, are sufficient to distinguish it from true infantile paralysis.

Sclerosis of the lateral columns of the cord cannot easily be confounded with polio-myelitus. It is true that there is no affection of sensibility in such cases, no decubitis, and no paralysis of the sphincters; but the invasion of the complaint is essentially chronic, and incomplete or complete paralysis, with muscular rigidity and increased reflex excitability, more especially of tendons, are the chief symptoms. Where the patient is able to walk he shows a peculiarly rigid or spastic gait, which is entirely different from the halting and lame gait of a person suffering from chronic myelitis, as well as from the jerky and unsteady walk, which is seen in locomotor ataxy. Sclerosis of the lateral columns may, however, co-exist with wasting of the anterior cornua, and then constitutes a disease which Charcot has recently described as lateral amyotrophic sclerosis. This mostly begins in the upper extremities, which become more or less paralyzed and wasted, while the antagonists of the paralyzed muscles become rigid and contracted. The consequence of this is, that the arm is held tightly to the body, the forearm flexed and pronated, and the hands and fingers strongly flexed. After this has existed for some months the disease progresses to the lower extremities, causing incomplete or complete paralysis with rigidity. There is no anæsthesia, no decubitus, no paralysis of the sphincters. After a time the rigid muscles begin likewise to waste, when the contractions disappear. Death takes place by the degeneration attacking the motor nuclei in the medulla oblongata, with consequent *paralysis of the lips*, tongue, pharynx and larynx, that is, labio-*glosso-pharyngeal paralysis.* The chronic and progressive course of the disease is sufficient to distinguish it from polio-myelitis, the onset of which is rapid.

III. Chronic Spinal Paralysis.—Duchenne has described a disease which he calls sub-acute or chronic anterior spinal paralysis. This has some points in common with the one to which I have just drawn attention, but is sufficiently disginguished from it by its onset and progress being essentially chronic. It occurs in adults, and leads to paralysis and muscular atrophy in the legs, but there is no fever, the paralysis is slowly developed, and it has a tendency to progress upwards, so that after a time the upper extremities become likewise involved. Anatomically it consists of chronic inflammation of the anterior cornua of the lumbar and cervical enlargement, which leads to wasting of the multipolar ganglionic cells, thickening of the coats of the blood-vessels, and overgrowth of the nuclei of the neuroglia. The anterior nerve-roots are wasted, and the muscles are atrophied or in a state of fatty degeneration. The causes of the affection are as yet obscure; cold, injury, and excesses of various descriptions are believed to give rise to it. The first symptoms are generally lassitude and fatigue in walking, and pain and stiffness in the loins and the lower extremities. After a time there is decided muscular weakness, sometimes only in one, at other times in both legs, which gradually increases, and ultimately merges into complete paralysis. Soon afterwards wasting of the muscular substance sets in, accompanied with loss of reflex excitability, while sensation remains normal. The paralysis then spreads to the upper extremities, which become awkward and clumsy, and ultimately refuse service altogether. The muscles of the back and abdomen participate occasionally in the affection, but the bladder, rectum, and sexual organs remain in their normal condition. There is no decubitus, and the general health is satisfactory. The electrical phenomena in the nerves and muscles are the same as those which we have found to occur in the acute form of the disease, but are more slowly developed. The symptoms now remain stationary for a variable length of time, and then there is gradual improvement, which commences in the arms and hands, so that the patient is again able to feed himself, to write, etc. The lower extremities follow, and ultimately there may be complete recovery. Often, however, certain sets of muscles remain paralyzed, so that the patient, although not quite an invalid, nevertheless remains somewhat crippled. In another set of cases the disease progresses upwards to the medulla oblongata, when articulation, mastication, deglutition, and ultimately respiration, are interfered with, and the patient sinks from exhaustion or asphyxia.

IV. Wasting Palsy.—The last form of disease of the anterior cornua which we have to consider, is that which is generally known as progressive muscular atrophy, or wasting palsy. This was for a long time considered to be an affection of the muscular tissue itself, unconnected with any lesions of the nervous system, and even quite recently Prof. Friedrich, of Heidelberg, has, in an able and painstaking monograph, pronounced it to consist of a chronic multiple inflammation of the muscular fibres, which he has called progressive chronic poly-myositis. The microscope shows the following changes in the muscular tissue:—There is proliferation of the insterstitial connective tissue of the internal perimysium, between the primitive bundles. The muscular corpuscles are swollen and increased, their nuclei proliferated, and the transverse stripes cloudy and granular. As the connective tissue continues to proliferate, the muscular fibres perish, either by simple atrophy, or after previous division, or by fatty and lardaceous degeneration. Ultimately the muscle is found to have undergone cirrhosis, and presents the appearance of a tough, thin cord, or a tendinous membrane, which only shows a few remaining insular patches of reddish muscular tissue. There is consequently considerable decrease of bulk. In a number of cases, however, myositis may become complicated, either at an early period or towards the end, with diffuse lipomatosis, which never commences in the muscles themselves, but always in the interstitial connective tissue, as soon as this has begun to proliferate. Fat-cells originate from the connective tissue corpuscles, which are seen to be filled with oil-globules; and these latter conglomerate so as to form regular drops of fat. When this change has set in, the bulk of the muscles appear augmented, and may increase beyond its original size. Within this fatty mass, however, the original fibrous structure of the muscles may still be recognized by the symmetrical arrangement of the different layers of fat.

Luys was the first who discovered in this disease, in addition to the changes in the muscular tissue which I have just described, alterations of the gray matter in the centre of the cord; viz., wasting of the ganglionic cells of the anterior horns, which were replaced by granular masses containing oil-globules. These observations were confirmed by Lockhart Clarke, Jaccoud, Charcot, and others. The question has therefore been much discussed whether the nature of the complaint is myotic or neurotic. Friedreich, who has with great ability contended for the myotic theory, is of opinion that progressive muscular atrophy commences as primary myositis, and may lead to secondary changes in the nervous system, which consist of neuritis, affecting first the intramuscular nerves, afterwards the nerve-trunks and the roots of the spinal nerves, and ultimately the cord itself. He would therefore consider the degenerative process in the peripheral nerves, and the ganglionic cells of the anterior horns, as simple consequences of muscular atrophy and ascending neuritis.

Although Friedreich's reasoning is ingenious, he does not explain why the nerve-roots and nerves should so often have been found healthy when the anterior horns were diseased; but the chief objection to his theory lies in the association of this complaint with other allied diseases, which points strongly to the affection being neurotic rather than myotic. Thus it occurs together with progressive bulbar or labio-glosso-pharyngeal paralysis, which has been conclusively shown to arise from wasting of the ganglionic cells of the motor nuclei of the rhomboid fossa; and this association is easily explained by assuming the degenerative process to spread from the cord to the corresponding portion of the medulla oblongata. Again, in the later stages of locomotor ataxy muscular atrophy is noticed, showing that the disease has crept forward from the white posterior columns to the gray matter and its anterior cornua. We are therefore led to the conclusion that in all these diseases the muscular tissue is only secondarily affected, and that the symptoms depend upon those areas of the cord and medulla oblongata which become involved in the first instance, and upon those which afterwards participate in the pathological process.

Prognosis and Treatment.—Finally I must speak about the prognosis and treatment of these affections. I regret to say that both are at the present time far from satisfactory. It is true that some few cases of infantile paralysis recover spontaneously within a month or two, and it is to these that Kennedy has given the name of "temporary paralysis;" it is also true that some few cases which are efficiently treated in the commencement recover, or at least very nearly so. Nevertheless it must be admitted that on the whole the results of treatment have, until now, been somewhat discreditable to our art. In the vast majority of cases there is ultimately permanent partial paralysis, with atrophy, deformity, and contraction. As the nutritive centre of the paralyzed limb is destroyed, *growth is arrested; the limb* becomes shorter than its fellow; the bone is *thinner; the muscles waste* away completely, or are replaced by fat; the arteries, nerves, and tendons become smaller and even the muscles which are not paralyzed do not grow properly. All this is more marked in the upper than in the lower extremities, and more particularly in the hand and fingers. The bones are more fragile and flexible, and therefore become easily subject to deformity and fracture. Curvature of the spine is thus readily induced, as the vertebræ become too soft to be able to bear the weight of the body. Relaxation of the articular ligaments leads to complete or incomplete dislocation of the bones. Thus the knee is bent backwards and inwards, and the head of the humerus is felt to be out of its socket. Deformities of some kind are indeed rarely absent, and various other causes besides those already mentioned contribute to their production. The degree of the paralysis is not exactly the same in the different sets of muscles in a limb, and consequently those which are only slightly paralyzed may become permanently shortened by losing the influence of their antagonists. Another cause of muscular rigidity and contractions is the odd way in which paralyzed children manœuvre with their limbs, more especially the legs, in moving about, when one or both legs are nearly paralyzed. They walk on their hands, lean heavily on the knees and hips, and bring the body into all sorts of strange attitudes. The feet suffer more particularly, and orthopædic surgeons are aware that almost all cases of non-congenital clubfoot are owing to infantile paralysis. In the upper extremity the deformity generally spares the elbow, while the shoulder becomes raised from shortening of the deltoid, trapezius, and pectoralis muscles, and there is difficulty in moving the arm outwards; and the wrist and fingers are often permanently flexed.

What has been said about the prognosis of infantile paralysis applies, to a great extent, to the other diseases of the anterior cornua which we have been considering. The chronic form of anterior polio-myelitis in adults seems more amenable to treatment than the acute one; while for progressive muscular atrophy a really effective remedy has still to be discovered.

The treatment of infantile paralysis, which is generally recommended, consists as long as there is fever, of rest in bed, calomel, leeches, and cupping to the spine, more especially the region of the cervical and lumbar enlargement, rubbing in of mercurial ointment, and counter-irritation by tincture of iodine and blisters. With the exception of rest and a scanty diet, I believe these measures to be useless, and have, therefore, ceased to employ them. The only remedy in which I have any confidence, in the acute stage of this disease is the subcutaneous injection of ergotine. Ergotine has been physiologically proved to have the power of contracting the blood vessels of the spinal cord, more especially when it is directly introduced into the circulation, without the intervention of the stomach, and as intense hyperæmia of the arterioles and small veins, and bursting of capillary vessels of the cord from excessive distension is one of the characteristic anatomical features of the disease; ergotine appears to be a direct antidote to that condition. I use a solution of Bonjean's ergotine in distilled water, which, if thoroughly pure, is generally not irritating, and the dose I inject is one-fourth grain for a child from one to two years of age; one-third grain for one from three to five years; half-a-grain for children from five to ten years of age, and a grain for patients upwards of ten years. These injections must be repeated according to the symptoms which may be present either daily or twice a day. Our guide of action in this matter should be the thermometer and the pupil. In severe cases where the temperature runs up to 103° or 104° the remedy should be used more freely than when the thermometer shows only a rise of one or two degrees. The fever being in all these cases a secondary phenomenon, consequent upon local inflammation, may be rapidly reduced by the use of the ergotine, which thus proves a truly antiphlogistic remedy; and its employment should be continued until the temperature has fallen to the normal standard. Where the pupil remains much contracted after the use of the remedy some time may be allowed to elapse before it is again injected, but where it is large the dose may safely be increased and repeated. The injection is not painful if well performed, and is quite as easily done, even in restless children, as it is to make them swallow a dose of medicine. The place of injection is a matter of indifference. I generally inject into the legs as most convenient.

Such is the treatment I recommend for the attack itself. As soon, however, as the inflammation has subsided, the ergotine must be discontinued, and iodide of potassium in doses varying from two to ten grains, according to age, several times a day, be substituted for it. This serves to induce the absorption of the inflammatory effusions, to check the excessive growth of connective tissue which is liable to follow, and thus allows those ganglionic cells, which have not been entirely destroyed by the disease the possibility of regeneration. At the same time the constant galvanic current should now at once be used, and be made to pass through the diseased portion of the cord. If the leg only be affected, the current should be directed to the lumbar enlargement; if an arm only be paralyzed, the cervical enlargement must be acted upon, and if the muscles of the body suffer likewise, the whole dorsal region of the cord should be included in the application. The electrodes should be large, the force of the current gentle, and the application be continued for from three to ten minutes, according to the extent of the lesion. It being most important that the current should pass through the anterior cornua, it is better to have one pole on the spine and the other one on the front part of the body, than to place both electrodes to the spine. Thus, if the cervical cord has to be acted upon, we place the positive pole to the nape of the neck, and the negative to the manubrium sterni; where the lumbar enlargement is diseased, the positive pole is put to the loins, and the negative a little below the umbilicus; while where the dorsal cord has to receive the voltaic influence, the positive pole should be slowly guided along the whole of the dorsal spine, the negative being left stationary at the ensiform process. Erb has recommended to send the current through the cord, first in one direction and then in another. so as to utilize the influence of either of the poles on the diseased parts. From general considerations of the catalytic effects of the current, the action of the positive pole alone appears to me to be most called for, and I should therefore employ Erb's proceeding only if the mode of application I have just recommended should fail to effect much improvement in the patient's condition. An early resort to this mode of voltaic application is of the greatest importance, for where the ganglion cells have been either entirely destroyed by inflammation, or where those which were left uninjured or only slightly altered have, in the course of time, become compressed and squeezed by excessive development of connective tissue, only little can be expected of any therapeutic measures. Where the case comes under treatment six months or longer after the invasion of the disease, we have to do more with the consequences of the attack than with an actively proceeding pathological process. Iodide of potassium is then useless, and small doses of phosphorus and cod liver oil are the best medicines for improving the nutrition of the nervous matter. The phosphorized cod liver oil, first prepared many years ago at my suggestion by Savory and Moore, is a very useful preparation at this stage. Subcutaneous injections of strychnia, which have been strongly recommended by Mr. Barwell, have, in my hands, not yielded those results which would appear to have been seen by other observers, and as strychnia is a dangerous poison, and may easily do a great deal of harm, I cannot recommend its use. Mountainous or sea air, the thermal springs of Rehme, Wildbad, Teplitz, or Gastein, and a very nutritious, even stimulating diet, are more useful. The voltaic current should likewise be applied to the seat of the disease in the cord in the way just described, but as we have at this stage to do with wasting of the paralyzed muscles and with consecutive deformity, a peripheral application of the constant current and faradization of the paralyzed nerves and muscles must now be combined with it. When the nerves and muscles are found to have entirely lost their faradic excitability, faradization is of no service, but where there is a slight faradic response it is generally beneficial. On the whole, however, the voltaic current will be found superior to the induced, even for peripheral application, as voltaism, is in the majority of cases, the only agent which will produce any muscular response. Gymnastic exercises of the muscles, shampooing and friction of the paralyzed limbs with the linimentum ammoniæ and other stimulating applications should also not be neglected.

I cannot enter in this place into the surgical treatment of the deformities consequent upon infantile paralysis, which steps in as a last resource when the hope of affecting a cure has vanished, but much can be done by the practitioner in preventing the development of such deformities by appropriate appliances intended to supply the loss of the muscular power.

Acute anterior myelitis of the adult, being essentially the same disease as infantile paralysis, should be treated in a similar manner. The injection of ergotine may, however, in such cases be used more freely than in children, that is to say, two or three grains may be injected at a time, more especially where there is a high degree of inflammation, as evidenced by a great rise in the temperature of the body. In chronic polio-myelitis the internal use of the liquid extract of ergot, in doses of 20 or 30 minims several times a day, is sufficient, and should be combined with electrical appliances, which in their turn may be succeeded by a course of mineral water treatment. For progressive muscular atrophy no medicine appears to be of any benefit, and the sheet anchors to which we have to trust in the treatment of that disease are galvanization of the suffering portion of the spine, galvanization and faradization of the suffering muscles, and carefully regulated gymnastic exercises of the latter.—JULIUS ALTHAUS.

PARALYSIS, Local.—*Natural History.*—Paralysis limited to particular sets of muscles. Of this there are several varieties, three of which require special consideration—namely, (a.) Facial paralysis; (b.) Scrivener's palsy; (c.) Glosso-laryngeal or pharyngeal paralysis. The two former only are named by the College of Physicians. Of these in their order; and first, of—

FACIAL PARALYSIS.—*Natural History.*—Paralysis of the muscles of the face is usually confined to one side, but sometimes, though rarely, affecting both sides. It is apt to be followed by contracture or tonic spasm of the muscles previously paralyzed ("Spasmodic Tic" of Marshall Hall).

Facial paralysis is due to one of two causes, namely—(1.) To a lesion of the trunk simply, or of branches of the portio dura nerve at some part of its course, generally through the petrous bone, and independent of cerebral disease. This form of facial paralysis is sometimes also known as Bell's paralysis, or peripheral facial hemiplegia, or mimic facial palsy. (2.) Facial paralysis may be due to a cerebral lesion—a cause which acts upon the nerve before it enters the internal auditory meatus—in which case it is usually accompanied by hemiplegia of the limbs on the same side. This form of facial paralysis is known as cerebral or centric facial hemiplegia. (3.) A third form of facial paralysis is ascribed to reflex paralysis of the seventh pair, consequent on paralysis or lesion of the fifth pair of nerves, generally an agency involving the peripheral ramifications over the face.

The phenomena of facial paralysis are confined to the "muscles of expression," including the buccinator, and do not involve the masticatory muscles (masseter, temporal, pterygoid) supplied by the fifth pair of nerves. A description of the phenomena of facial paralysis must therefore have due regard to the course and distribution of the seventh nerve (see Text-Books of Anatomy).

One very important point to remember is, that the portio dura of the seventh pair is the only motor nerve of the buccinator muscle for all its actions, whether of expression or of mastication; and that the fifth pair supplies it, not with motor, but with sensory fibres. The buccinator muscle is interrupted in all its functions, whether of expression or of mastication, whenever the portio dura is paralyzed; it is unaffected, and all its actions are preserved, in motor paralysis of the fifth pair.

The threefold functions of the portio dura must also be recognized. Considered as a musculo-motor nerve, the portio dura contains within its common trunk the following sets of fibres serving different functions:

(1.) Voluntary motor fibres, by which the voluntary movements of the features are performed, and by which especially labial and buccal speech and mastication are accomplished. (2.) Emotional fibres by which the features express the passions more or less voluntarily. (3.) Reflex motor fibres, which are involuntary, for the act of winking and for the movements of the nostrils in the acts of respiration.

Looking, therefore, at the circuitous windings of the portio dura, its intricate distribution, and the various textures through which it passes, it can readily be understood how varied are its tendencies to be involved in disease, and even traumatic injury. Tumors, hæmorrhages, or other lesions, may involve the nerve within the cranium. While it traverses the circuitous windings of the aqueduct of Fallopius, it may be injured and pressed upon by the results of necrosis or caries of the bone, or of suppuration or lesions of the fibrous sheath or periosteum; while lesions or tumors, involving the parotid gland, may injure the nerve and paralyze the parts it supplies.

Three forms of paralysis of the facial nerves ought to be discriminated in considering the diagnosis of central facial hemiplegia, namely,—voluntary motor paralysis, emotional paralysis, and reflex paralysis.

The accession of facial paralysis (when peripheral) is usually sudden, and is generally discovered by the patient when he begins to eat. He feels something peculiar in the act of chewing, and has some difficulty in mastication. When the food gets between the paralyzed cheek and the teeth, the cheek is instinctively squeezed or pressed upon by the hand, in order to push the food between the teeth again. The difficulty of mastication only concerns the buccinator muscle, and not the other muscles of mastication. There is no pain. The patient is soon and often abruptly told, by the first kind friend who happens to meet him, that his mouth is awry, and that it becomes considerably more so when he laughs. He then naturally wishes to see all this for himself; and, on looking at his face in the looking-glass, he may verify the observation of his friend, and is then generally greatly frightened and alarmed by the discovery.

When the face remains at rest the paralyzed side looks slightly flatter, and more flaccid and pendulous, than the sound side. The eye of the paralyzed side is also more widely open than the eye on the sound side. When speaking, and still more when laughing is attempted, the angle of the mouth on the paralyzed side remains perfectly motionless, but on the sound side it is immediately drawn upwards and outwards. The eyelids, the cheek, and half the lip of the paralyzed side remaining thus motionless when efforts are made to contract the muscles, a singular and characteristic expression is given to the face. The eyelids remaining motionless on the paralyzed side, the patient is unable to shut the eye, but the globe of the eye itself moves perfectly in any direction at will, which shows that the motor muscles of the eye are not affected, and that the paralysis affects exclusively the orbicularis palpebrarum muscle, and does not involve the levator palpebræ superioris. Sight is unimpaired. The tongue is protruded with ease and regularity; lingual articulation is sufficient; but articulation of certain words is difficult, on account of the paralysis of the cheek. Sometimes the arch formed by the pillars of the fauces is larger on the paralyzed side than on the sound one, by the uvula inclining to the sound side. Cutaneous sensibility is unimpaired; and the patient may be in the best of health, the ailment being purely local—namely, paralysis of the facial muscles of expression on one side. There is an absence of all electric excitability of the paralyzed muscles supplied by the seventh pair.

Treatment.—Paralysis due to lesions which are destructive of the nerve are beyond medical aid. In cases suitable for treatment the agents used with most benefit are blood-letting by leeches behind the ear of the affected side, or over the mastoid region. They ought to be applied repeatedly, especially if any pain exists on pressure in that region. Blisters, with dressings to keep them open, medicated by veratria or strychnia ($\frac{1}{25}$ to $\frac{1}{8}$ of a grain of sulphate of strychnia or of veratria), mixed with five or six times their weight of pounded sugar. Electrization in the form of faradization by a Stohrrer's two-celled volta-electric machine; or in the form of an interrupted galvanic current, from a continuous current battery (as from a Muirhead's battery of fifteen cells), the number of cells being very gradually increased.

In using faradization each facial muscle should be separately galvanized, instead of attempting to pass the current through the facial nerve. The muscles are thus more powerfully influenced, and they are more apt to regain voluntary contractility at different periods, some muscles before others. At first the apparatus should be one capable of producing currents with very rapid intermissions; but when any muscles begin to contract, the intermissions should be few, and the sittings at long intervals, otherwise contraction of the muscles is apt to increase and become incurable.

When contracture of muscles supervenes, they ought to be stretched or pulled out mechanically. To remedy contraction of the buccinator, a small billiard ball must be worn for a long time inside the cheek, to be replaced after a time by a larger one.

In cases where rheumatism or syphilis prevails, or periostitic affections, small doses of iodide of potassium, persevered in for a lengthened period, are of service, with the frequent use of phosphate of soda, as a daily morning aperient. Bichloride of mercury (corrosive sublimate), in small doses, continued till the gums are slightly tender, is sometimes of service.

The daily action of the bowels ought to be carefully regulated, especially by such medicines as keep the colon in funtional activity.

(*b.*) SCRIVENER'S PALSY.—*Natural History.*—Morbid excitement of the motor fibres of the nerves of the muscles of the fingers and thumb holding the pen, resulting in cramps, so as completely to prevent writing. A want of co-ordination of the muscular movements engaged in writing—long-practised and very familiar movements—seems to be the first pathological element in the disease. In this respect the disease approaches locomotor ataxy, where there is partial loss of controlling power. Every attempt to write calls forth uncontrollable movements in the thumb, the index finger, and middle finger, so that the pen starts up and down on the paper. The handwriting ceases to be legible—a mere scrawl results, or grotesque *interrupted.* The more the patient persists in the attempt to write, the mor does the difficulty of steadying the hand and using the pen increase. The visible and sensible contractions of the muscles of the thumb and fingers are soon followed by similar contractions of the forearms, even extending in some cases to the upper arm. Apprehensive attention to the subject and dread of the occurrence of spasm are generally sufficient to ensure a paroxysm after the disease is well established. The hand and arm seem capable of every other combined movement except that of writing; and when all attempts at writing cease, the spasms also subside and entirely disappear. On the other hand, the more the patient attempts to continue writing, so much the more violent does the spasm become. The disease is not entirely limited to the operation of writing. Shoemakers, milkmaids (or milkers of cows, goats, and ewes), nailsmiths, musicians, compositors, saddlers, sempstresses, and men who handle small hard articles with considerable muscular grasp, are subject to similar cramps. Hence the disease is known under a variety of names—as cobbler's spasm, milker's spasm, nailer's spasm, writer's cramp. One theory regarding the production of the cramps implies that they are reflex through the excitement of the muscular nerves or muscular sense. Hence, holding the hand even in the attitude of writing, although it does not grasp a pen nor touch the paper, will induce the spasms. On the other hand, it is believed that the irritation is similar to what takes place in the convulsive movements of chorea and stammering.

Treatment.—Tonic treatment, with rest from writing, has been attended with good results; also the galvanic current applied to the affected muscles. Complete rest from the usual mechanical use of the hand must be insisted on; also nourishing food, with a milk diet in abundance, or cod-liver oil. As to medicines, when the disease has not got beyond the sensation of heat and cramps in the ball of the thumb, I have seen good results from the syrup of the phosphates of iron, quinine, and strychnia; and generally those remedies noticed under the subject of anæmia may be prescribed. Mechanical appliances, such as contrivances which fill up, as by a ball, the palm of the hand on which the fingers rest in writing, have been of service; and there are also appliances by which writing may be accomplished without the aid of the fingers, and which therefore may be of service in securing rest to some extent, in cases where livelihood depends on writing.

(*c.*) GLOSSO-LARYNGEAL PARALYSIS—*Syn.,* GLOSSO-PHARYNGEAL PARALYSIS.—*Natural History.*—Diminution and subsequent loss of the motor power of the tongue, soft palate, and lips, associated with structural changes in the roots of the motor nerves which supply the affected muscles. The disease progresses always rapidly to a fatal termination. Concurrent paralysis of the lips, tongue, vellum, palate, and vocal cords, together with the associated muscular movements of deglutition, have recently been recognized, and, which is more or less capable of explanation by the close anatomical connection between the muscles supplied by the vagus, the spinal accessory, and the lingual nerves. The lower rootlets of the spinal accessory nerve (forming the external branch) arise, in common with the anterior roots of the spinal nerves in the cervical and brachial region, from the anterior gray substance of the spinal cord; while the upper rootlets (forming the internal branch) have a totally different and a double origin—one from a special nucleus continuous with that of the pneumogastric behind the central canal, and the other from the proper nucleus of the hypoglossal in front of the canal. Some of the fibres of the hypoglossal seem to take their origin from the spinal accessory nucleus.

The constant anatomical lesion in this form of paralysis is atrophy of the motor roots of these nerves, sometimes extending to the anterior roots of several of the upper spinal nerves, attended with more or less paralysis of limbs and incipient muscular atrophy, tending to become general.

The disease is thus closely related to progressive muscular atrophy, with progressive palsy of cerebral nerves.

The earliest and most noticeable symptoms are those which are due to palsy of the muscles of the tongue, the soft palate, and the lips, those of the larynx and pharynx becoming implicated at a later period. The patient cannot blow, whistle, nor spit, nor pucker up his mouth, and saliva runs from the mouth involuntarily. The origin, progress, and termination of the disease are so characteristic that there is no other identical affection in the whole range of nosology. Embarrassment of speech first attracts attention. The tongue seems less supple, and the utterance becomes more and more thick. The food is apt to lodge between the teeth and the cheek the cause of this being different from that which obtains in Bell's paralysis. In such facial paralysis it is due to paralysis of the buccinator muscle; here it is due to the circumstance that the tongue being more or less paralytic, awkward, and incapable at the tip, the patient is obliged to use his fingers to remove the food from between the teeth and the cheek, and so to replace it on the tongue. Pronunciation of certain words is made through the nose. The vowels *o* and *u* cannot be properly sounded, on account of the deficient contractility of the orbicularis oris muscle. Saliva is apt to dribble from the lips and corners of the mouth. The paralysis continuing to progress, the tongue at last lies motionless in the hollow of the mouth, behind the lower teeth. Its apex and base are equally motionless, and not a word can be articulated. The shape of the tongue is also altered. It has sunk down in the centre, presenting a hollow in the middle line, with its edges raised. The soft palate also droops, the tip of the uvula rests upon the tongue, and is generally callous or insensible to irritants. The first stage of deglutition thus becomes impossible. The morsels are swallowed by holding the head backwards, and facilitating their gliding down by fluids. Sometimes only a small quantity of the food gets into the œsophagus, the remainder being propelled upwards through the mouth and nostrils, and sometimes small portions of food will find their way into the larynx, causing great distress. The appetite remaining good, but swallowing being thus impossible, constant hunger aggravates the distress.

The expression of the countenance is blank and strange. Excessive weakness of the respiratory movements is soon superadded to these already serious symptoms. The walls of the chest and the diaphragm scarcely move. If the patient be asked to blow out a candle he cannot do it. The flame will be scarcely agitated by his utmost efforts to blow upon it. Coughing is equally inefficient; so that if catarrh should supervene, there is great difficulty in expelling the increased secretion of mucus. Asphyxia is thus apt to prove fatal. The heart's action becomes abnormally rapid, but fever does not exist. The body temperature tends to sink below the normal, and betokens, with the other phenomena, the imperfect oxygenation of the blood. General debility makes rapid progress, and the patient rather inclines to remain in bed, sitting up with his head supported on pillows, inclined to one side sufficiently to allow of the saliva flowing away which he is unable to swallow. Sleep is disturbed by paroxysms of suffocation, and death is apt to ensue suddenly by cessation of the heart's action, unaccompanied by pain or noise.

Treatment.—Faradization is of doubtful efficacy at the commencement, but gives relief at the later periods, by temporarily restoring function to the affected muscles, to the lessening of the trouble of deglutition and by exciting the respiratory acts.—William Aitken.

PARALYSIS OF THE INSANE.—*Natural History.*—A form of *general* paralysis in which the cineritious substance of the brain is the seat of cloudy swelling of its minute elements, the brain-cells, with lesion of minute blood-vessels and increase of connective tissue, tending to peculiar disorder of the intellect, general failure of nerve power, muscular debility, frequent blood extravasation (hæmatoma), convulsions of the nature of apoplexy and epilepsy combined, and to involvement of the whole brain in degeneration and atrophy, so that general and complete paralysis of body and mind results. Muscular debility from general failure of nervous powers rather than motor paralysis, characterizes this disease; and so far muscular power in this and some other diseases of intellect has been described as the "pulse of insanity." Delusions of grandeur prevail, and a form of convulsions between apoplexy and epilepsy are common, but not constant phenomena. The nomenclature of the disease—"General Paralysis of the Insane"—is unfortunate. "An acute cerebro-meningitis with paralysis is found in the ordinary category of diseases treated by the general physician; whereas a chronic cerebro-meningitis, attended by a slower derangement of the bodily and intellectual faculties, is styled "general paralysis of the insane," and is ignored by the same physician and handed over to the alienist. "The general paralysis of the insane is a disease which has an appreciable morbid anatomy; and when cerebral diseases are classed on a pathological basis, it comes under the domain of the ordinary physician; but since the mind suffers in a more chronic manner than in most of the other affections which are seen by such practitioners, this complaint is in practice treated chiefly by the alienist." There are, however, many reasons for drawing a line between this and other mental affections. Thus, it sometimes arises from a definite cause, such as an injury, in a person not predisposed to insanity; it runs a certain course of not many years' duration, and it may attack a brain previously sound. Cases of the disease are on record where the general paralysis followed—(1.) injury; (2.) dementia; (3.) where it was not attended with any exalted ideas; (4.) where it existed without mental symptoms: (5.) where maniacal symptoms accompanied the general paralysis. It seems to be a distinct species of paralysis rather than a mere variety of disorder of the intellect.

Whether the disease commences suddenly or gradually, one of the earliest phenomema is a feeling of weariness of the lower extremities—wearyiedness after little exertion. The gait also soon becomes peculiar and characteristic, as the patient walks "to and fro"—"to and fro"—without any definite object, but an expression of restlessness, which indicates the desire to continue the movements. As the disease advances, more attention is paid to the walk, so that the centre of gravity is maintained with great care, and the patient moves with caution and studied attention, looking neither to the right hand nor to the left. The step is characteristic. The foot has no elasticity of motion, but comes down flat upon the ground. The steps are shuffling and short, while the legs are thrown outwards and apart, and the patient straddles rather than walks. Perfect co-ordination of the muscles of the lips first begins to fail, indicated by slight tremulousness; and a feeling of stiffness of the lips may be complained of. As a consequence there is hesitation in articulating words, and particularly of words with labial letters. Afterwards, as the disease progresses, any attempt at speech induces convulsive movements of the corners of the lips, twitches or quivering of the upper lip, and contractions of the chin. The head at the same time is nodded shortly and sharply, as if to aid expression. The speech soon progresses in difficulty: it becomes thick, like that of a drunken man, until articulation is impossible. The face becomes devoid of all expression. It is mask-like, or like a curtain—a perfect blank of thought and feeling. *If the patient is asked to put out the tongue, he involuntarily raises his hand to his head,* as if to aid the effort; but the mouth is then merely opened, and if the tongue is protruded, it is done in a jerking way, and it trembles greatly. When the patient is made to stand erect, he appears to balance his weight on both legs as equally as possible. He cannot "stand at ease," and the position of the arms and hands is constrained. In sitting, the attitude is square, squat, and graceless, the head droops slightly, the thighs are held parallel, and the knees bent at a right angle, each hand resting on a knee or on the elbows of a chair.

It sometimes happens that muscular feebleness exists for some time before mental imbecility betrays itself ; but when disorder of intellect manifests itself, it is characterized by delusions of a pecliar kind, such as the possession of good fortune, great wealth, high birth. The animal spirits are exuberant ; there is general contentment and good humor, except when thwarted or contradicted, when an outburst of ungovernable passion is apt to be induced. The temper is extremely irritable and uncertain, while the views held for the time and expressed vary from day to day. The delusions are apt to be characterized by suspicion, with continual fear of assassination or injury. When the invasion has been gradual, the intellect becomes slowly weaker and weaker ; the will becomes feeble and purposeless ; the memory treacherous and fails, so that words are omitted in speaking and writing, or sentences are repeated. The pupils may be contracted at first, with subsequent irregularity, and the irides variously susceptible to light. Anæsthesia may exist, with impairment of tactile sensibility. The handwriting is greatly altered, needlework is clumsily done, so that with much fumbling the thread is got and held with difficulty, and often dropped ; and all acts of delicate manipulation requiring a keen sense of touch become impossible. The patients are apt to fall and to be much knocked about without feeling pain, and sometimes clumsily pull the features of their face with their hands.

The first evidence of impaired excito-motory functions is imperfect deglutition, the mouth being filled and the food kept there, or rolled from side to side. There is danger also of its becoming impacted in the pharynx, and so choking the patient. That reflex action is also weakened, is shown by the fact that the soles of the feet may be tickled without causing reflex muscular movements. The sensitive irritability of muscles to electricity is sensibly impaired or altogether absent. In the last stage of the disease there is a constant tendency to gather up the bedclothes and roll them over, and all instinct of decency is lost. Death generally takes place suddenly, as from meningeal apoplexy, during or after one of the convulsive attacks, or by asphyxia. If he survives such an apoplectic attack—and as these attacks of convulsions between epilepsy and apoplexy are frequent—layers of effused blood become organized, and hæmatoma of the dura mater are often met with after death in this disease.

This general paralysis of the insane steadily advances from bad to worse, but with occasional remissions in the symptoms ; and hence it has also been named "progressive general paralysis."

The average duration of the disease is about thirteen months ; few survive three years ; and it is seldom protracted beyond four or five.—WILLIAM AITKEN.

PARALYSIS, Pseudo-hypertrophic—*See Muscles, Diseases of.*

PARALYSIS, Sensory—*See Anæsthesia.*

PARAPHIMOSIS—*See Penis, Diseases of.*

PARAPLEGIA.—*Natural History.*—A form of paralysis affecting the lower half of the body, in which both legs, and perhaps, also, some of the muscles of the bladder and rectum, are paralyzed. Of this kind of paralysis there are at least two forms, which differ as to their mode of origin, namely, reflex paraplegia; and paraplegia, due to myelitis in some one of its numerous forms, the result of injury or of disease.

Reflex paraplegia, or reflex paralysis, are terms which indicate paralysis from peripheral irritation—a paralysis uniformly associated with injuries or disease of parts or organs remote, and not directly continuous with the nerves from the spinal marrow.

Forms of paralysis due to reflex action are—(1.) Emotional paralysis; (2.) pregnancy and uterine affections, as from dysmenorrhœa, or metritis, are apt to induce such reflex paraplegia, or sometimes hemiplegia or amaurosis; (3.) neurolytic paralysis, in which, from no adequate cause, the functions of the cord seem suspended for a time, associated generally with exposure to cold and wet; (4.) paralysis from the irritation of worms in the intestinal canal; (5.) paralysis from the irritation of teething in children; (6.) urinary paralysis; (7.) mechanical injury of one part may give rise to reflex paralysis in another part, as in some cases of gunshot wounds: as when (*a*) a wound involving the muscles of the right thigh is followed by reflex paralysis of the right arm and left leg; (*b*) a wound of the right thigh, followed by paralysis of right arm; but in all, however great the loss of motion or sensation at first, the power of movement and sensation begins to return early, and continues to improve till the part has nearly recovered all its normal powers; and in nearly all, some amount of paralysis continues permanent, or the part remains weak.

It is necessary, therefore, to look for some primary disease to account for reflex paraplegia, believing at the same time that such primary disease may ultimately establish a myelitis, while a diagnosis of reflex paraplegia is mainly based on a contrast of the phenomena which attend the various forms of parplegia due to other causes.

Treatment.—In cases of reflex paralysis means must be taken—1st. To diminish the peripheral irritation which causes the paralysis; 2d. to improve the nutrition of the spinal cord; 3d. to prevent the ill effects of rest on the paralyzed nerves and muscles.

In cases of disease of the urethra or prostate, an injection of a solution of one grain of the extract of belladonna, in twenty drops of laudanum, is to be made into the urethra, and the injection should be retained for half an hour or even an hour, after which some emollient decoction should be used, such as linseed tea, to wash out the passage. Every two or three days this operation should be repeated. If the bladder be diseased, a solution of one grain of the extract of belladonna, in twenty drops of laudanum, may be used as an injection, after a complete emission of urine. Injections of carbolic acid are also of use in counteracting decomposition of urine and epithelium in the bladder. If the prostate is enlarged, a suppository ought to be put at times into the rectum. One of the best suppositories for this purpose is composed of the following ingredients, namely: White sugar, white soap, and gum-arabic in powder, of each three grains; opium, in powder, a grain and a half; or belladonna extract, one grain; or both combined. These being mixed together, the mass is to be formed into a conical shape, and being dipped in melted wax, is ready to be introduced when required into the rectum. When the irritation causing reflex paraplegia starts from the vagina or uterus, a pill of half a grain of the extract of belladonna, with a grain of opium, surrounded by a piece of cotton wool, is to be introduced into the vagina, and made to surround the neck of the womb. By means of a thread attached to the wool, it may be withdrawn as soon as the pain ceases or diminishes. Opium, combined with strychnia, is of greater use in reflex paralysis; and of all remedies, strychnia is best suited for promoting the second indication, which points to increasing the nutrition of the spinal cord. The dose combined with opium must be a small one, namely, one-fortieth to one-thirtieth of a grain daily;

when used alone, its dose may be one-twentieth of a grain; and when employed together with belladonna, its dose must be still larger. In cases where no congestion nor inflammation of the spinal cord exists, strychnia ought to be persistently employed; but its use ought to be suspended at once whenever it produces spasms, or even numbness of the feet in getting out of bed in the morning. Sulphur baths are also productive of benefit.

The third indication, namely, to prevent the ill effects of rest on the paralyzed nerves and muscles, is best met by the employment of galvanism, if there is atrophy, and shampooing of the paralyzed limbs; if no wasting exists, faradization is to be used until the muscles act easily under its use. Two or three applications, of ten minutes each, in a week, are sufficient; but if no sign of contractility is observed after a week, it will not do any good.—WILLIAM AITKEN.

PAROTID TUMORS, divided, for practical purposes, into (1) innocent, (2) malignant. Former commerce near lobe of ear as small, hard swellings, perhaps originally enlargements of a lymphatic gland. They are fibro-cartilaginous. Increasing, they tend to grow outwards as a square mass, and inwards so as to displace part or whole of the parotid. But cancerous tumors are more diffuse, more fixed, more painful, increase faster and tend to infect the lymphatics of the neck.

Treatment.—A movable tumor corresponding to the first description above given should be excised; a malignant tumor is fixed, and can rarely be advantageously meddled with. In excising a parotid tumor, cut as much as possible in the direction of the fibres of the facial nerve, and keep the edge of the knife towards the tumor. Simple tumors can sometimes, to a great extent, be shelled out. Facial paralysis, which sometimes follows these operations, is usually incurable. Remember the size of the vessels embedded in the parotid. Remember also position of Steno's duct, a wound of which may cause salivary fistula.—C. B. KEETLEY.

PAROTITIS, Idiopathic—*See Mumps.*

PATELLA, Dislocation of—*See Dislocations.*

PATELLA, Fracture of—*See Fractures.*

PEDICULOSIS—*See Phthiriasis.*

PELLAGRA.—*Definition.*—Pellagra is a serious disease, occurring endemically in Northern Italy and Southern France, one of its chief characteristics being an erythema of the skin. This appears on those parts of the body most exposed to the sun, such as the hands and arms, neck and chest. Women suffer from it on the face, owing to the fact that their head dresses do not protect them from the sun's rays, while among men, whose faces are screened by large hats, this part is more rarely affected.

Symptoms.—It commences as a mere erythema of the skin, which is accompanied by a sense of irritation. During the winter this subsides, but a deposit of more or less pigment remains. Vesication does not occur, but the eythema is followed by desquamation. On the return of the summer the erythema again makes its appearance, and each year the skin is left more stained with pigment. At first the patient simply complains of lassitude, but gradually becomes melancholic; later on suffers from marked cerebral symptoms, which terminate in insanity.

Prognosis.—The length of the disease—that is, from first symptom to death—varies from a few to ten or twelve years, usually about five. Although it generally proves fatal, this is not always the case; but even when recovery takes place it is only partial. Complete restoration to health is rare.

The causes of pellagra are not well understood. It is a disease altogether confined to the poor, and to those who work in the sun. It has been attributed to the character of the food which these people eat, and has been thought to be associated with maize, their chief article of diet. In the damp season maize is attacked with a parasitic fungus, which is supposed by Bellardine to be the origin of pellagra. When maize is supplemented by other food, as in the large towns, the disease does not exist. Pellagra is not contagious, nor is there any evidence that it is hereditary, although members of the same family who are exposed to the same conditions are often attacked with it together.

Treatment.—The treatment of the local inflammation is simple. Protection from the rays of the sun always leads to a subsidence of the symptoms. As has been explained, a nourishing and varied diet in the early stages of the disease will often restore the patient to health.—MALCOLM MORRIS.

PELVIC ABSCESS.—*Definition.*—Collection of pus consequent on suppuration taking place after inflammation in the connective tissue, ovaries, pelvic peritoneum, or uterus; or in the sac of a hæmatocle or ovarian cyst; or in the breaking down of tuberculous deposit.

Causes.—Any cause producing cellulitis, hæmatocle, or pelvic peritonitis may continue into abscess; the puerperal state, impure air, pyæmia; and remote, the strumous of syphilitic diathesis.

Symptoms.—Violent rigors, fever, throbbing pain in the pelvis, pressure on rectum and bladder, and often pain down the thigh.

Signs.—Vaginal examination and the conjoined examination reveal a fluctuating swelling, to be differentiated from ovarian cyst by the history, and by its greater fixidity.

Diagnosis.—Not difficult by means of the symptons and signs.

Prognosis.—Pelvic abscesses may evacuate themselves per vaginam, per rectum, per vesicam, or by the abdominal walls. If into the peritoneal cavity, fatal. After rupture the orifice may be too small for the free evacuation of the pus, and it may still accumulate.

Treatment.—Stimulants and nutritious diet, tonics with iron. If patient's constitution is suffering, free evacuation. Delay for a time till fluctuation is marked, then open by (1) vagina, (2) rectum, or (3) abdomen. Opening to be by aspiration, followed perhaps by injection of the cyst with iodine, or by trocar, and if the cyst is large the finger may be passed in to allow of the opening being made free. To close the cavity, use injections of iodine.—HEYWOOD SMITH.

PELVIC CELLULITIS.—*Definition.*—Inflammation of the connective tissue behind in front of, or at the sides of the uterus, or between the layers of the broad ligament. Called also parametritis, periuterine inflammation, etc. It has three stages: (1) congestion, (2) effusion, (3) suppuration.

Causes.—Parturition or abortion, inflammation of the uterus, or ovaries, injury from coitus, caustics, pessaries, tents, operations, or blows. Exciting, cold and fatigue.

Symptoms.—Rigors, pain, fever, painful micturition, and defecation, tendency to menorrhagia or mentrorrhagia. Occasionally fever is absent, or symptoms only of weight and fulness in pelvis, with nocturnal fever.

Signs.—Feeling of puffiness usually on one side of the uterus, with great sensitiveness; subsequent induration, and the detection by the conjoined examination of a swelling of variable size. Additional light gained by rectal examination. If the disease is further advanced, the uterus is pushed laterally away from and by the swelling, and is often verted or flexed, and generally more or less fixed. Not rarely the mass is somewhat movable together with the uterus.

Diagnosis.—From fibrous tumors, hæmatocele, and pelvic peritonitis. The former are not tender, are movable, are unaccompanied by fever, and are attached to the uterus. Hæmatocele sudden in its onset, soft at first then hard, whereas pelvic cellulitis is hard first, then soft from suppuration. In pelvic peritonitis the swelling is higher, the uterus less movable.

Prognosis.—Guarded, as, though serous effusion may be absorbed, purulent collections may be evacuated and destroy life. More usually favorable, though there is danger from peritonitis. The consequences may be sterility from destruction of ovaries, permanent displacement of uterus, dysmenorrhœa, or menorrhagia.

Treatment.—In acute stage, leeches, poultices, sedatives, and absolute rest. Afterwards blisters, mercury, gentle purging, warm douche, change of air, tonics.—HEYWOOD SMITH.

PELVIC CELLULITIS, Puerperal.—*Definition.*—Periuterine inflammation of the connective tissue, accompanied by effusion.

Causes.—Similar to those of metritis and septicæmia.

Symptoms.—Severe rigors, which may be repeated at intervals for several days; pain referred to one or both inguinal regions, countenance anxious, arrest of lochia.

Signs.—Tenderness on pressure over one or both inguinal regions; temperature and pulse high, the latter fuller than in septicæmia; examination per vaginam reveals a mass by the bimanual touch on one side of or surrounding the uterus, which is more or less fixed; after a time, suppuration may take place in the effused mass, and a pelvic abscess result, which may point to the abdomen, or more usually burst per rectum or per vaginam.

Diagnosis.—From the other puerperal inflammations by the frequency of the rigors, and by the vaginal examinations. The uterus is more rapidly fixed in peritonitis.

Prognosis.—Not so unfavorable as the other maladies.

Treatment.—Perfect rest, nourishing diet, continuous poultices, leeches to the abdomen, opium, perchloride of mercury; afterwards quinine, with opium or henbane. When an abscess is formed, blister over the abdominal swelling.—HEYWOOD SMITH.

PELVIC HÆMATOCELE—*See Hæmatocele, Pelvic.*

PELVIC PERITONITIS.—*Definition.*—Inflammation of the peritoneum covering the pelvic viscera.

Causes.—Pelvic cellulitis, parturition, or abortion; gonnorrhœa, metritis, ovaritis, salpingitis; cold during the catamenia; tubercle, cancer.

Symptoms.—A rigor, fever, anxious countenance; pelvic pain, nausea and vomiting.

Signs.—Tenderness on deep pressure supra pubem, sometimes very acute; pulse small, wiry, about 120; tenderness on pressure on the vaginal cul-de-sacs and on the uterus; vaginal roof feels hard; subsequently tumefaction around the uterus, often displacing the uterus.

Diagnosis.—Difficult to differentiate, especially from pelvic cellulitis and pelvic hæmatocele. Cellulitis more common after parturition or operations on the pelvic viscera. In cellulitis tumor easily reached; tends to suppurate; tenderness more often on one side; pain continuous, countenance not anxious, nausea not very severe, uterus not entirely fixed. In pelvic peritonitis tumor not always felt, and if so, high; suppuration rarer, tenderness over whole hypogastrium; pain severe and paroxysmal, countenance very anxious, uterus entirely fixed. Differentiation from pelvic hæmatocele—the latter sudden in its attack, rare, with absence of fever, symptoms of loss of blood.

Prognosis.—If after parturition, grave; in the non-puerperal state, more favorable. If the effusion is purulent, more grave than if serous.

Treatment.—If seen quite early, ice to the hypogastrium; subsequently a large number of leeches over the hypogastrium, followed by hot poultices, opium pushed to narcotism; perfect rest, milk, beef tea, etc. Should the pyrexia be severe, Thornton's ice-cap will be found of great service. After the first stage, blisters above the groin. In chronic cases, fresh air without exertion, nutritious diet, perhaps stimulants, tonics with iron. If effusion persists, aspirate, and wash out the sac with carbolic acid.—HEYWOOD SMITH.

PELVIS, Fracture of—*See Fractures.*

PEMPHIGUS.—*Definition.*—Pemphigus is characterized by the appearance of bullæ in successive crops, terminating either in the absorption of the fluid, or in bursting aud giving rise to the formation of ulcers.

Symptoms.—This disease differs according to the size, position and behavior of the bullæ and subsequent ulcers, but may be divided into two chief varieties,—pemphigus vulgaris and pemphigus foliaceus, but the latter is rare.

Pemphigus vulgaris includes those forms which are most frequently seen, and consists of two or three small bullæ situated on slightly inflamed bases, which increase very rapidly until they cover a surface of about two inches in diameter. They are white, tense and generally oval or round, but may lose their shape by becoming confluent. The fluid in the bullæ is at first clear and alkaline, but in a short time becomes turbid and acid. A bulla may terminate by absorption of its fluid, when nothing but the dried-up cuticle remains, or it may burst, when it leaves an ulcerated surface, more or less covered with crusts. A dark stain remains for some time to mark the site of a bulla, and as the disease has a tendency to appear in successive crops, the skin gradually becomes more and more stained. The bullæ may be scattered irregularly over the body, or may be grouped together in circles or semicircles, from the circumference of which fresh bullæ grow at the same time as those in the centre disappear. In other but rare cases red patches of skin are found, in which the bullæ are badly defined or even absent. All parts of the surface may be attacked with pemphigus, even the vagina and the rectum, but the head, palms and soles are almost always exempt. At the conclusion of the disease the skin becomes dry, and desquamation, often over a larger area than the actual site of the eruption takes place. As a rule constitutional symptoms are not severe, depending solely on the amount of the eruption, but when the bullæ are of large size, and crops rapidly succeed each other, the itching becomes intolerable.

Pemphigus foliaceous differs from the preceding variety in color, situation, and character of the blebs. The bullæ are of a red or yellow tint, and the vessels of the base can be seen through the fluid, which in this variety is small in quantity and does not distend the bulla. Around the first-formed bullæ others are developed, which eventually coalesce, while the fluid escapes and leaves crusts, the appearance of which is compared by Cazenave to that of flaky pie-crust. Although this condition is at first limited in area, it gradually spreads over the surface ; and as there is no disposition for the part originally attacked to heal, a large portion of skin becomes affected, from which the smell is most offensive. The constitutional disturbance is slight at the commencement, but as the disease progresses feverishness, sleeplessness, and diarrhœa set in, and the patient finally succumbs.

Diagnosis.—Pemphigus is liable at all times to be mistaken for any disease in which vesicles or bullæ occur.

From erysipelas it may be distinguished by the extent of the inflamed surface and the defined margin of the former, while the latter has only a narrow areola around the vesicle, and by the fact that the constitutional symptoms which are characteristic of erysipelas do not occur in pemphigus.

From eczema simplex it may be distinguished by the smaller size of the vesicle in the former, and from scabies by absence of the burrows. Pemphigus foliaceus often presents great similarity to eczema rubrum, but the marked marasmus, pigmentation, and freedom from fibrous thickening of the skin in the former are the chief points of diagnosis between them.

Prognosis.—This is favorable if the eruption is limited to a small area, and if there be but few bullæ; but when they extend over a large surface, as in pemphigus foliaceus, death is the almost invariable result.

Treatment.—This consists in improving the general condition, while local applications appear to exercise no influence on the course of the disease. A generous and nourishing diet is necessary, and for medicine arsenic in full and repeated doses is as important as quinine is in ague. Much relief also is afforded by frequent bathing, removing the crusts, and keeping the ulcers clean.

Little, however, can be done in pemphigus foliaceus but to combat the symptoms as they arise.—Malcolm Morris.

PENIS, Diseases of. — Most common affections are venereal. Others are congenital malformations, usually slight; phimosis and paraphimosis; herpes preputii, warts, elephantiasis, cancer, gangrene, priapism.

Penis, Congenital Malformations of.—(1) Hypospadias, (2) epispadias, (3) deficiency of corpus spongiosum, (4) the penis may be bound down to the perineum, between the testes, so as to arch forward during erection (I have been one such case, and I think Mr. Erichsen's case of "Adhesion of Penis to Scrotum" was probably exactly similar), (5) adhesion between glands and prepuce.

Hypospadias.—Urethra stops short on lower surface of penis. Slight degrees common and of no consequence. If it extend far backwards, *e. g.*, so that the urethra opens near the root of the penis, both urine and semen are emitted at right angles to the penis. But even in such cases paternity is not absolutely impossible. Plastic surgery is sometimes successful in such cases (*vide* Wood, *Med. Times*, vol. i. 1875; Jordan, *Lancet*, vol. i. 1876).

Epispadias.—Urine flows from a groove on upper surface of base of penis. Always combined with extroversion of bladder, *q. v.*

In such a case as 4 (above) divide the adhesion. Congenital adhesion between prepuce and glans may be torn asunder with any small blunt instrument. With malformations, the following condition may be classed when congenital.

Phimosis.—Prepuce cannot be drawn back. Either Congenital, or the result of swelling, usually inflammatory and specific, of the prepuce (acquired). *Consequences of Congenital Phimosis.*—Local irritation, balanitis, calculous concretions between prepuce and glans. Urinary obstruction and vesical irritation. Masturbation. Reflex convulsions, paralyses, and contractions (Sayre). Even hip-joint disease (Barwell). *Treatment of Congenital Phimosis.*—Circumcise. If circumcision be objected to, success will generally attend steady efforts repeated day by day to draw back the prepuce. Acquired phimosis must be treated according to the indications of each case. Generally rest in bed, cleanliness and patience suffice in an acute case; but occasionally it is absolutely necessary to either circumcise, slit up, or forcibly dilate the prepuce. If the prepuce be itself inflamed, it is best to merely slit it up in the dorsal middle line.

Paraphimosis.—The prepuce behind the glans strangles it, and cannot be pulled forward by the patient. *Treatment.*—Invariable success, except in old cases, may be expected from Mr. Furneoux Jordan's plan of compressing the penis gently and patiently in the cavity formed by hollowing slightly the palms of the two hands and then opposing them. Soon the œdema yields, and then the paraphimosis is reduced by the fingers and thumbs. The prelimiary compression, if gently and patiently done, makes bearable an otherwise intolerably painful procedure. 2 In case of need, the following operation may be done: Draw the glans forward, "then, passing the point of a narrow-bladed scalpel into the sulcus on the dorsum of the penis, make a perpendicular incision about one-third of an inch in length through the integument at the bottom of the groove directly across it."—Erichsen. Thus the constricting band is divided.

HERPES PREPUTII may be mistaken for chancre. Distinguishable by its extremely superficial character, by the number of vesicles at first, and afterwards by their being nothing to see except excoriation and pus. Lasts a few days. Readily cured by washing once a day with hot water and dressing with zinc ointment. Patients subject to it should never use soap to the part, but wash daily with water only and dry thoroughly.

PENIS, WARTS ON.—For pathology, etc., *vide* CONDYLOMATA and SYPHILIS. *Treatment.*—Snip of with scissors. Dress with cupri sulph. pulv. and zinci oxid. Or keep constantly applied lint soaked in ℞ acid. nitric. dil. ʒij., aquæ Oj. In obstinately recurrent cases, the prepuce should be worn back and the glans kept exposed.

PENIS, CANCER OF. EPITHELIOMA.—(Scirrhus is extremely rare.) Usually commences after middle life, on the glans, as a firm warty growth, with a broad base. Its progress resembles that of cancer elsewhere, but it is usually slow, and it seldom infects other organs. *Treatment.*—Thorough excision. Amputation not necessary where a clean sweep can be effected without so radical a measure. When there is sufficient doubt about the diagnosis, give a fair trial to antisyphilitic remedies.

PENIS, GANGRENE OF.—Besides the ordinary simple and specific inflammations to which the organ is liable, Humphry instances the following as recorded causes of gangrene: typhus and paraplegia. Spontaneous gangrene has been observed (Partridge).

PRIAPISM is rather a symptom than a disease, and points to one of two classes of causes: (1) reflex irritation, *e. g.*, from gonorrhœa, prostatic disease, and injuries to penis; (2) paralysis, *e. g.*, from injuries to spinal cord.

The penis is liable to many other affections common to the ordinary tissues, and these are frequently mistaken for specific affections; *e. g.*, I have known one of the most able specialists in London to diagnose an inflamed lymphatic as a hard chancre. Phlebitis occurs occasionally, producing the ordinary symptoms.

PENIS, INJURIES OF.—Chief points in connection with these are that (1) extensive contusion produces priapism, lasting for days; (2) wounds should be carefully adjusted, and united by sutures; (3) bleeding is easily arrested by cold and pressure; (4) swelling of the penis in children should suggest the possibility of a string tied round the organ having been hidden by the swelling.—C. B. KEETLEY.

PERICARDIUM, Adherent.—*Anatomical Characters.*—Chronic effusion may remain after acute pericarditis, or sometimes the surfaces of the membrane become universally agglutinated, and calcareous matter may be deposited in the adhesions, or the outer surface of the pericardium may further unite with the chest-wall.

Symptoms.—Subjective symptoms are often absent in cases of chronic pericarditis but there may be uneasy sensations, or even a dull pain over the cardiac region, and, in exceptional cases, anginal attacks have been noticed. Disturbed action of the heart, palpitation easily induced, and shortness of breath on exertion are the chief symptoms complained of, if any. From the effects of extensive adhesions upon the heart, grave interference with its action and with the circulation may ultimately arise, and serious organic changes may be set up. An agglutinated pericardium will seriously increase the danger from an attack of any pulmonary inflammation.

Physical examination may reveal the presence of fluid in the pericardium; or, when adhesions have been formed between its surfaces, as well as with the chest-wall, the signs are more or less of the following character: 1. Depression of the præcordial region, with narrowing of the spaces. 2. Increase in extent, or permanent displacement of the impulse, especially elevation, there being no other obvious cause for this; the apex-beat being unaltered by change of posture, or by a deep inspiration, or the impulse having altogether unusual characters, being attended with recession of the spaces or of the epigastrium, or with an irregular jogging movement, both systolic and diastolic. 3. Usually increased area of dulness, which is not altered after a deep inspiration, there being other signs that the lungs do not expand over the cardiac region. When there is extensive calcification, the percussion-sound is said occasionally to have an osteal character. A rough friction-sound may be heard over some part of the cardiac region.

PERICARDIAL DROPSY.—The important facts relating to dropsy of the pericardium may be thus summed up, and it will at once be seen in what respects it differs from inflammatory effusion: 1. In the great majority of cases this condition is a part of chronic general dropsy; it may set in acutely in Bright's disease, and rare instances have been met with in which it owned a mechanical origin, having resulted from the pressure of an aneurism or other mediastinal tumor, disease or thrombosis of the cardiac veins, or sudden extreme pneumothorax. 2. There are no severe initiatory symptoms, pyrexia is absent, and there is no marked disturbance of the heart's action. 3. The effusion, which is simply serous, is not abundant. Hence there is no bulging; the physical signs indicative of fluid are less marked than in pericarditis; and the dulness is more liable to be altered by posture. 4. Friction-signs are absent throughout. 5. Hydropericardium generally follows hydrothorax, and hence it is preceded by the symptoms and physical signs of the latter condition, the effects of which it necessarily tends to aggravate.

Treatment.—This is merely a part of the ordinary treatment for dropsy. Paracentesis might possibly be required.

PERICARDIAL HÆMORRHAGE.—Blood may be found in the pericardium as the result of: 1. Spontaneous rupture, either of the heart or a cardiac aneurism; of an aortic aneurism; of one of the coronary vessels; or of vessels in cancerous deposits. 2. Injury. 3. Pericarditis, the effusion being more or less hæmorrhagic. 4. Diseased conditions of the blood, such as scurvy and purpura.

Symptoms.—The symptoms are generally severe in connection with actual hæmorrhage into the pericardium, indicating loss of blood and interference with the heart's action; but they will necessarily vary with the amount of blood present, and the rapidity of its accumulation. Sudden death may occur. The physical signs are those of an accumulation of fluid in the pericardial sac.—FREDERICK T. ROBERTS.

PERICARDITIS.—*Natural History.*—The fibro-serous membrane containing the heart, and investing it on its external aspect, is liable to inflammation, sometimes diffused over a large extent of surface, tending to the effusion of a serous fluid, which becomes purulent—suppurative pericarditis. In the chronic forms of pericarditis, inflammation may express itself—(1.) By attacking the original membraniform exudation not yet removed; (2.) by thickening and pulpiness of the pericardium; (3.) by a thick, tough, universally unyielding envelope; (4.) by hæmorrhage; (5.) by purpura; (6.) by tuberculosis; (7.) by osseous concretions; (8) by cysts from parasites and sacculated conditions of the pericardium, containing *pus-like* fluid—the remains of old pericarditis—so-called abscess of the pericardium. The acute forms of pericarditis generally involve the muscular walls of the heart to a greater or less extent.

The symptoms vary much as regards their expression, and in accordance with the co-existing malady with which pericarditis may be associated. In some instances they are most insidious in their approach: as when percarditis follows upon pleuritis or pneumonia, scrofula with tubercle (tubercular pericarditis), Bright's disease, chronic disease of the heart, or aortic aneurism; and participation of the percardium in the inflammation often remains undiscovered till revealed by post-mortem examination. In other cases the symptoms are violent and unmistakable from the commencement. Rheumatic pericarditis is generally attended with more violent symptoms than non-rheumatic pericarditis. The most marked characteristics are decided evidence of local trouble in the chest, especially pain more or less severe in the præcordial region; and from this point it radiates over the whole of the sternum, extending even to the brachial plexus and down the left arm, accompanied by disturbance of the heart's action, a sensation of constriction over the whole chest, by urgent distress, and by an incapacity to take a long breath, or to cough. From these causes the patient is restless and anxious, and this anxious expression of the countenance is often peculiar and striking from the first. When acute pericarditis is not the result of rheumatism, the patient may suffer no pain, and the symptoms are often most obscure. The countenance is pallid, and there is an incapacity or unwillingness to lie on the left side. The pain in the region of the heart may be acute, severe, and shooting towards the shoulder, augmented by movement and increased by pressure upwards against the diaphragm. There may be febrile exacerbation, and the pulse, varying from 90 to 110, full and strong, is often intermittent, or otherwise irregular. Dyspnœa may exist in proportion to the distension of the sac with fluid, pressing on the lungs, and sometimes on the œsophagus, causing also dysphagia, pain in the cardiac region, palpitation, and subsequent greater dyspnœa as most common signs. This state of things having lasted from three to four days to a week, the patient may die suddenly. But all of these signs may be absent, and yet pericarditis may exist. The action of the heart may get feebler and feebler, weaker and weaker, the circulation becoming irregular. The pulse at the most may get intermittent, the veins of the neck prominent, the skin cold and pale; and, with œdema of the limbs, death may soon follow, with pericarditis—latent and unrecognized. When the pericardial effusion is great, it tends to impede, by its pressure, the action of the left lung, and hence the patient prefers in such a case to lie on his left side, so as to give more free play to the right lung; or he sits up, but bent forward in his bed. Pure idiopathic pericarditis is rarely witnessed, and very rarely occurs as a severe or clinically important form of disease. It is generally the accompaniment of some general or constitutional disease, especially rheumatic fever, Bright's disease, scarlatina, smallpox, scurvy, pneumonia, pleurisy, peritonitis, abscesses in liver or mediastinum, hydatid cysts, pyæmia, scrofula, cancer.

The most characteristic physical sign is a double frottement or friction-sound, which closely resembles a rasping murmur. It has been named a "to and fro" sound. It is apt to disappear gradually from below upwards with the increase of effusion, and to run with its decrease; and it may disappear from the apex to the base with the progressive formation of firm adhesions. Usually limited to the region of the heart, it changes its character and its seat from day to day. It is sometimes remarkably modified by local bleeding, passing from a loud rough sound to a soft bellows murmur—most rough and intense during inspiration. The hand applied *over the cardiac region* will sometimes detect a rubbing sensation, which *ceases with the cessation of* pericarditis. But friction-sound is not necessarily present in pericarditis. It may be absent or present for long periods—its presence or its absence bearing no appreciable relation to the intensity of the disease. The amount of fluid effusion has much to do with this. A really considerable effusion of fluid at first muffles, then renders barely audible, and finally removes the sound, which becomes indistinct as the heart's sounds are also gradually extinguished. Like the heart's sounds, the friction-sound continues audible longest, and is recovered soonest towards the base. When the lymph is rapidly condensed into firm granulations, and the parts of those granulations most exposed to attrition have become polished and rubbed away, so that the points gradually receding from each other present fewer and fewer points of contact, then the friction-sound may subside, although no further effusion of fluid takes place. Again, the presence of friction-sound is not necessarily a proof of the existence of pericarditis. It is only when the murmur arises for the first time under observation, or when it accurately coincides with the development of symptoms, or where it corroborates and explains the symptoms, and the other physical signs already existing, in such a manner as to leave no doubt of its nature, that we are justified in assuming that a friction-murmur over the heart is pathognomonic of acute pericarditis. Increased extent of dulness in percussion, and marked prominence over the cardiac region, are also two characteristic signs of pericarditis.

A valuable distinctive sign of pericardial effusion when contrasted with pleuritic effusion, is, that when the left side is dull in front and resonant behind, it is a pericardial and not a pleuritic effusion. Any large increase of fluid at once betrays itself, especially in the young, by the protrusion of the left cartilages and ribs, the widening of their interspaces, prominence of the ensiform cartilage, and, in some extreme cases by an epigastric fulness or even tumor. When the fluid increases, the pulse becomes feebler, and more disposed to falter and to flutter. It becomes irregular and excited; and often the patient is so fixed in one position that he fears to move, lest he may aggravate by exertion the dyspnœa and action of the heart from which he suffers so intensely. The jugular veins not unfrequently become distended, and this distension does not lessen during inspiration when the effusion is great. A significant sign is thus furnished of the greatness of the obstruction which exists to the thoracic circulation. Œdema and great coldness of the extremities are also apt to supervene with such a state of things. When, however, the products of inflammation become solid, and little serum remains, the pericardium, by the opposed serous surfaces, becomes attached to the heart throughout, and the pulse then resumes its force and regularity; and, if the patient survives, this adhesion remains for life. It is thus often an unsuspected source of chronic disease of the muscular substance of the heart, tending to asthenia, asthma, dropsy, and sudden death.

Treatment.—It is very doubtful if calomel ever does any good in pericarditis, notwithstanding that its use, so as to effect the gums, has been advised by physicians of the greatest experience and eminence. In all the constitutional diseases in which pericarditis occurs as a complication, mercury is certainly contra-indicated. In rheumatism and in Bright's disease which furnish by far the larger number of cases of pericarditis, mercury is decidedly objectionable; and it is well known to be productive of most injurious consequences in Bright's disease.

In sthenic and acute cases blood may be drawn from the arm till some effect upon the pulse is produced; but preference is to be given to repeated relays of leeches over the præcordial region, or to free cupping. From four to twenty leeches applied to the left edge of the sternum, followed by fomentations, very commonly relieve or moderate the pain, and *rapid* improvement follows their use. To judge as to the repetition of leeching, the force of the heart must be observed, as indicated by the pulse at the wrist, by the actual strength of its impulse, and by the character especially of the first sound. If the impulse continues vigorous, and the first sound is undiminished, the further local abstraction of blood may be repeated; but if the impulse has manifestly declined in force, while the first sound is lessened, great caution is required in the further abstraction of blood. Fomentations, plain or medicated with opium, friction with camphorated and ioduretted liniments, and, in obstinate cases, the use of blisters, are the chief local remedies to be relied on besides leeches. In the second stage of the disease, when liquid effusion distends the pericardium, some reliance may be put in treatment by a blister of a large size over the præcordia and diuretics. Digitalis is a suitable remedy in cases where the beat of the heart is very frequent and insufficient, causing cyanotic and dropsical symptoms. Its effect is then very markedly beneficial. Opium, in doses of one grain (*i. e.*, stimulant doses), every third hour, shows its beneficial effects when it does not produce contraction of the pupil, nor headache, hot skin, furred tongue, nor constipation. Battley's solution is the most useful preparation; but the remedy must be watched closely. In the rheumatic form, colchicum, in the form of a draught, and the administratian of alkaline remedies, are indicated by the constitutional state. Warmth, especially moist warmth, and flying blisters, are the best agents to promote absorption of fluid.

Paracentesis is recommended in all those cases in which the effusion is so great as to cause alarming distress, orthopnœa, obstruction to the venous circulation, and serious interference with the heart's action. In such cases a fine exploring trocar and canula are to be gently introduced (not plunged), so as to make a valvular opening below the heart, either to the left of the xyphoid cartilage, or through the fifth intercostal space, close to its anterior extremity, and the fluid drawn off by means of a syringe. The result may be merely palliative; but even to afford the sufferer opportunity, after the operation, to pass the night in his bed (perhaps for the first time in a long period), and to enable him to sleep a little, is a great gain.—WILLIAM AITKEN.

PERICARDITIS, Tubercular—*See Tubercular Pericarditis*

PERINEPHRITIS—*See Kidney, Suppurative Inflammation in Connection with.*

PERINEUM, Diseases of the.—Chief affections are abscess and fistula. Hernia and a misplaced testicle in the perineum occur very rarely.

PERINEUM, ABSCESS IN THE.—Commonly caused by a slight urinary extravasation behind a stricture. *Symptoms.*—At first attention is attracted by fever, perhaps rigors, and pain in the region of the bulb. A hard lump is felt; this increases and softens. *Treatment.*—Open early; incise in the middle line. If a stricture co-exist, it is good practice to divide it at the same time (external urethrotomy). At all events the stricture, being the cause of the abscess, must be treated.

PERINEAL FISTULA.—A result of perineal abscess. Generally closes when the original stricture of the urethra is cured. Perineal fistulæ occasionally have their origin in comparatively remote affections, *e. g.*, cancer within the pelvis. In order to cure a perineal fistula it may be necessary to (1) teach the patient to catheterize himself four times a day, or (2) to incise the fistula freely, or (3) to cauterize it; (4) it is to be remembered that the presence of a small calculus may prevent healing.—(Thompson.)

PERINEUM, INJURIES TO.—*Causes.*—Blows received in climbing over railings, &c., or by being thrown on the pommel of the saddle. Pressure of child's head in parturition. The injuries vary in seriousness from slight bruises to injuries involving such important structures as the urethra, rectum, and bladder. Parturition may result in—*Ruptured Perineum.*—Varies much in extent. The more extensive ruptures often allow the walls of the vagina, rectum, or bladder, as well as the uterus, to prolapse. The utmost annoyance may be caused by inability to hold the fæces. *Treatment.*—Sutures should be put in at the time when the injury occurs. Otherwise it is, except in trifling cases, advisable to postpone the operation until the child can be weaned and the mother restored to the best attainable health. *Operation.*—Scalpels with short and with long handles, forceps, long and short, strongly curved needles with handles (*e.g.*, Baker Browne's needles), sutures of silk, whip-cord and silver or catgut. Ligature, artery forceps, &c. Handled sponges. Duck-bill speculum; retractors. Lithotomy position. Assistant holds duck-bill speculum against anterior wall of vagina. Perineum, etc. is shaved. Square flaps of skin and mucous membrane are marked out on either side of rupture, involving part of the vaginal surface of the recto-vaginal septum, and widening somewhat towards the surface of the perineum. The flaps to be reflected thoroughly, not the slightest bit of mucous membrane to be left. But the flaps need not be removed altogether, should rather be left and sewn together over the vaginal edge of the wound. Pass posterior suture first. It should go through recto-vaginal septum, *i. e.*, should never appear in the rupture at all. Suture to enter and leave skin at one inch from edge of wound. Fasten on two pieces of elastic catheter, or else use button suture. When deep sutures are tightened, wound gapes superficially. To remedy this add a few small silver sutures. Before sutures are tightened, stop all hæmorrhage. Iced water usually recommended for this. I think hot water will be found to answer better (120° to 130° Fahr.). The hæmorrhage will be less if the mucous membrane only, without any of the subjacent erectile tissue, be shaved off (T. Smith.) To lessen tension, the superficial fibres of the sphincter ani may be divided laterally; or lateral incisions may be made a short distance outside the external end of the sutures. Bowels should have been well opened before, and should, after the operation, be kept closed by liq. opii. m x bis die, for a fortnight. For ten days draw off urine thrice a day with a catheter; and, for a week or two afterwards, patient should urinate on her hands and knees. Pay attention to the diet. Keep the wound and vagina clean. After washing with any antiseptic lotion, dry carefully and gently.—C. B. KEETLEY.

PERINEUM, Rigidity of the.—*Definition.*—A condition of the perineum where its dilatation is very slow or apparently arrested.

Causes.—Old cicatrices.

Symptoms.—Expulsive pains severe and painful, patient restless and anxious.

Signs.—Centre of perineum bulges as if the head would come through it; its anterior edge thin, hard, and unyielding.

Diagnosis.—Easy.

Prognosis.—Not unfavorable.

Treatment.—Hot bath, ointment (of belladonna?). If the perineum threatens to rupture, it should be divided on either side of the central line. —HEYWOOD SMITH.

PERIOSTITIS—*See Bones, Diseases of.*

PERIPNEUMONIA CATARRHALIS }
PERIPNEUMONIA NOTHA } —*See Influenza.*

PERITONEUM, Dropsy of—*See Ascites.*

PERITONEUM, Tumors of.—The most important morbid formations met with in the peritoneum are tubercle and cancer. Hydatids are occasionally found, and very rarely tumors of other kinds. The folds of the peritoneum, especially the omentum, frequently inclose a great quantity of fat.

Tubercle occurs in the peritoneum, either over limited patches corresponding to intestinal ulcers, as part of acute miliary tuberculosis, or extensively, secondary to tubercle in other parts.

Cancer is met with in the form of scirrhus, encephaloid, or colloid, the omentum being a comparatively frequent seat of the last-mentioned variety. Usually the peritoneum is involved secondarily by extension from one of the abdominal organs, but in rare instances it is affected primarily and solely.

These morbid growths tend to originate ascites, or acute or chronic peritonitis, and it is to these conditions that their local symptoms are mainly due. Sometimes fluid collects with extreme rapidity in cancer. There may also be more or less general symptoms. Colloid in the omentum yields the following physical signs: 1. The enlargement of the abdomen may be very great, but is wanting in uniformity; the umbilicus appears stretched, but not everted. 2. Firm irregular masses can generally be felt, and even if fluid is present fluctuation is very indistinct. 3. Dulness is usually elicited over the front of the abdomen. 4. Change of posture produces no effect, unless there is much fluid present. 5. The aspirator or exploratory trocar may bring away a slimy gelatinous fluid, and this is occasionally discharged by vomiting or per rectum.—FREDERICK T. ROBERTS.

PERITONITIS.—This disease is important from the great extent of the membrane, which is arranged in the form of an irregular sac, with no openings of any great importance. It is important in its connections with liver, intestines and stomach, for when a viscus is inflamed and the inflammatory action reaches the surface it will involve the serous membrane of that viscus, and consequently, when a membrane is inflamed the action will proceed to a limited extent to the viscus. As regards degree, this serous inflammation stands next to arachnitis. This is not a very common inflammation, much less frequent than the inflammation of pleura and pericardium. Pleurisy is most common of all. To me it seems that peritonitis is most common in mountainous districts. I think I have seen more of this disease in Vermont than in all other places together, including hospital practice. I shall consider peritonitis under four heads, 1st. Sporadic peritonitis. 2d. Peritonitis from perforation. 3d. Puerperal peritonitis. 4th. Chronic peritonitis, which is almost always associated with tubercles. We may have any of the three products of serous effusions, but there will always be plastic exudation which will be found more posteriorly on account of the supine position which these patients assume. In the ordinary forms there will be serum and fibrin. Pus is very rarely found alone. In the chronic form the plastic effusion will be organized in layers, the greatest quantity on the surface of intestines. Tubercles will be usually found in connection with the organized matter. Purulent effusion is frequent in the 2nd form of the disease.

SPORADIC PERITONITIS.—The rule is that this is a very painful disease, and that the pain begins at one point and spreads rapidly. This symptom is observed early in the disease. A child does not commonly occur. The pulse does not feel the influence of the disease until a later period, as a rule. I believe that we have no acute inflammation where the pulse runs up as high as it does in peritonitis. Constipation of an unyielding character exists in the height of the disease. This is as complete as if produced by some obstacle in the intestinal canal. The inflammatory condition extends just through the muscular coat of the intestinal canal (the same plexus of vessels supplying both the muscular and peritoneal coats). When a muscle is inflamed it cannot act, and to this paralysis is to be attributed the constipation; as long as the intestines are in this condition cathartics can only do harm by exciting inflammatory action in the mucous coat. This constipation lasts the whole time that the inflammation is severe.

Vomiting frequently begins in the early stages of this disease, and is due to reflex action of par vagum. The contents of stomach are first thrown up, then the greenish "spinach like matter," whose color and appearance is due to biliverdine. The explanation of this fact is not known but it occurs in other diseases. Gaseous extension or tumefaction of abdomen called tympanites or meteorism is present in first twelve hours. This gas which is chiefly CO^2., is contained in the intestinal cavity and not in the peritoneal cavity. It does not readily escape and this forms one of the differences between this and other diseases. The tympanites is one of the most common and marked symptoms of the disease. The countenance becomes pale, with the expression of calmness; features are somewhat pinched. This condition is known as the " Hippocratic countenance." The mind is generally clear. The urinary secretion is not generally affected, but there may be inability to pass urine from adhesions of the bladder. There is no special condition of tongue, sometimes slightly furred.

The causes are: 1st. The obscure causes which produce inflammation.

2nd. Perforation of stomach, colon or vermiform appendix. Perforations of stomach are from two causes.

1st. Perforating ulcer, which occurs near the pyloyus and sometimes partly in the stomach and partly in the duodenum. This ulcer appears like a little "well" and causes thickening of tissues to the extent of ¼ in. When perforation takes place the contents of stomach pass into the peritoneal cavity and persons die in 12 or 16 hours, though they often live to the second or third day. There may be ulceration of stomach without endangering life as in spinal or aphthous sore mouth of children. They are not of common occurrence because ordinary inflammation does not produce them. This, however, must not be taken for the erosion caused by the solvent action of the gastric juice after death. In protracted diseases this erosion does not take place because it is not apt to be taken to any extent previous to death. Some years ago an ulcer was found in a Bellevue patient 3 in. by 2½ in., extending to pancreas and liver and producing erosion and opening two large vessels of the liver, which gave rise to fatal hæmorrhage.

2nd. Stomach may be perforated by cancerous disease and then it is rapidly fatal. These are the only causes of perforation of stomach. Perforation of intestine at duodennm may result from an ulcer and is much the same as perforation of the stomach; this form is less rapid. I have never seen an instance of perforation of jejunum. Perforation of ileum may happen in typhoid fever near the ileo-cæcal valve; pain will first be felt on the right side low down. The whole colon is susceptible to perforation during acute dysentery, or from ulcers or cancerous disease. The ulcer is very much like that in stomach. They are circular and have been known to surround the intestine. Ulceration may be produced by a calculus in the gall bladder, but these generally pass into intestinal tube. The most common seat of perforation is at the vermiform appendix. In this sac a great quantity of substances taken with the food have been found at the post-mortem examination. The most common cause is fæcal accumulations, which fill the sac and cause ulceration, though I cannot recall a case of peritonitis in children under 14 years which did not occur from perforation at vermiform appendix. The pain begins at R. I. fossa and extends along the transverse colon; this disease always yields to treatment and seems subdued, but soon breaks out again with greater severity. In *healthy* persons there is a tendency to adhesion and to form a sac to contain the effusion for a day or two, but as it accumulates the sac breaks and so produces the symptoms over again. This feature seems to be distinctive of perforation at vermiform appendix. The effusion which is purulent gives rise to dulness. In a few instances the disease is not fatal, the pus being discharged by some opening.

Peritonitis is apt to be confounded with bilious colic; this is not an inflammation and is not attended with any paralysis of muscles of intestines, but depends upon an unusual contraction of the muscular fibres. There is no increase in the frequency of the pulse for some hours while in peritonitis this happens early. Colic is revealed by pressure in beginning but there is some tenderness after a while. No tympanites as in peritonitis. Obstruction of intestines is taken for peritonitis but here there is no increased pulse.

Under proper treatment a considèrable number will recover, but whatever is done must be done with energy, as the natural duration of the disease is "four days." Bloodletting both general and local has been practiced to a considerable extent in the treatment of this disease. Dr. Armstrong proposed bloodletting followed by a full dose of opium, as the latter perpetuated the effect of the bleeding; but while he looked upon both as necessary, if he could have but one he preferred the opium. Drs. Palmer and Child, of Vermont, treated their patients by the Armstrong method in 1844, with success. When I first adopted this mode of treatment eight recovered, the ninth died. The rule is to give as much opium as the patient can take without being narcotized. Begin with grs. ij. to iv. every two hours until the symptoms of narcosis begin to show. In the case of a hospital patient grs. iv. were given and the dose increased gr. j. every hour until a gr. xii. dose was taken. One objection to this plan of treatment is that it requires the attention of the physician who should always administer the opium himself. It is not important which preparation of opium you use but use the same from beginning to end. If pills are used they should be freshly made up every twelve hours. You are to give the opium by its effects and not by quantity; these effects are sensible contraction of the pupils, marked reduction in the frequency of respiration, diminished frequency of pulse, gentle perspiration of skin, itching of the mucous membrane of the nose, and easy but very much protracted sleep from which patient may be easily aroused. The pain first disappears. Tympanites continues until inflammation is subdued. Let the bowels alone for one week longer as they will move when inflammation subsides. The influence of opium is to be kept up until peristaltic action is re-established. The dose may then be diminished and when a spontaneous movement occurs it may be suspended altogether. A full dose may be required at night to produce sleep. I believe I have seen peritonitis from perforation cured by opium. In this form there seems to be a tendency for sealing up and the opening gives time for this healing process to be more complete. No other mode of treatment has been successful. Strong coffee and the cold effusions are to be used as antidotes in poisoning from opium. With a fair amount of caution and these two antidotes you will not be likely to lose a patient. I do not know of a single death produced by opium in this disease.

PUERPERAL PERITONITIS.—This form of the disease, called also puerperal fever and metro-peritonitis, occurs in lying-in women, although it may occur independent of parturition. It is liable to happen within thirty days of the occurrence of parturition, but generally within the first week, and greatest liability on the second or third day. This disease and its associate metritis are believed to be contagious for those in the same condition. There is no doubt but that it may be conveyed by the physician, although this is denied by Dr. Meigs, of Philadelphia. This disease has some connection with the cause which produces erysipelas. We rarely hear of one case alone, it is much more apt to be epidemic, and the effusion is purulent. The fatality of the disease, until lately, was enormous. In Bellevue Hospital not more than one in twenty-eight recovered. Now we have much better results, and the disease is much more manageable in private practice. Metro-peritonitis is much more commonly attended by a chill. It is far less often attended by pain, and this leads to mistakes in the diagnosis. The paralysis of muscular coat of intestines is not so great, and hence constipation is not so obstinate, and cathartics are not forbidden. The other symptoms are quite regular. The inner surface of uterus is always inflamed in puerperal peritonitis, so that I have given the name of endometritis to this condition. On examination there is found a pasty secretion on the walls of the uterus, which resembles thick glue and of the color of beef brine. Sometimes the whole interior of the organ is lined with this adventitious material, made up of blood, pus, and fibrin, formed into fibers, not unfrequently with cells. This indicates a most intense form of inflammation. The uterine sinuses may be inflamed and purulent matter deposited in their cavities. Pus is then mingled with the blood, and all the symptoms of pyæmia are present. From this symptom it has been called purulent uterine phlebitis. These uterine sinuses open on the inner surface of uterus by valvular mouths, situated where the placenta was attached. The inflammation passes over these mouths very readily into the veins, and it is this which makes the disease so dangerous. The lymphatics of the uterus take on the same kind of action, and those in the neighborhood of the round ligament are subject to purulent inflammation. The ovaries are enlarged and covered with lymph. There are evidences of inflammation in Fallopian tubes; purulent matter exudes by pressure. The fibrinated extremities are deeply congested and covered with lymph. In some instances the Graaffian vesicles are destroyed by this process. Puerperal fever, in which peritonitis is the leading feature, is much more easily cured than puerperal fever with metritis, the difference being in the purulent effusion. The symptoms of this are suppression of the lochia for twelve or twenty-four hours, pulse frequent and very small, extreme prostration like that in pyæmia, impaired digestion. The perspirations constitute the chief features of the disease. These take place after six to ten days, or in the second week. The first is usually preceded by a chill, but after this they come on without any reference to the chill. They seem to be conservative in their action, for without these the elimination of pus cannot take place. Abscess of the breast, or broken breast, may result from the sympathy of the breast with the uterus. Again, an abscess may occur in the iliac fossa, and obtain a great size, so as to open spontaneously, or require opening. The woman dies in a few days from the depressing influence of the pus upon the nervous system. The opium treatment is used in cases where peritonitis is a most prominent element. In Bellevue Hospital five out of six were cured by this treatment. Besides the opium, these women took a few doses of ver. viride to diminish frequency of pulse. Norwood's mixture of veratrum may be given, dose gtt. v, when the opium has reduced respiration but not the pulse. It produces great nausea, attended by prostration and a tendency to syncope. Alcoholics are to be used when such effects are produced. It is a very good treatment to give opium and ver. viride in alternate doses, and this is all that is necessary. In metro-peritonitis opium does not serve any important purpose, and it is useless to give it, except to soothe the patient. Leeches to the vulva or perinæum and bleeding promoted to a great extent. Opium grs. j or iij every two or three hours. Injections of warm and tepid water into vagina and uterus. The veratrum viride treatment has been introduced and is successful. During the period of purulent infection quinia sulph. grs.

(xv per day) combined with morph. sulph., to reduce irritability. If there is a tendency to the formation of abscesses food and stimulants will be necessary.

CHRONIC (OR TUBERCULAR) PERITONITIS.—A somewhat rare disease, usually dependent upon tubercles, but sometimes upon cancer. Occurs mostly in young persons, say from ten to twenty-five years of age. Is very insidious in its approach, and not usually made out until far advanced. The symptoms constitutional, are those of pulmonary tuberculosis, viz., paleness, emaciation, loss of strength, and frequency of pulse. Constipation of bowels alternates with diarrhœa, which is easily explained by the lesions existing. The peristaltic action being hindered by the glueing of the intestines together, fæces accumulate. These in short time indate mucous membrane and produce a free watery secretion, which constitutes the diarrhœa. The cause of irritation being removed by this discharge, the bowels become quiescent and constipation again ensues, and so on. The bowels are persistently tumefied and tympanitic. Tubercles (miliary) are on or under the pleura, and a low grade of inflammation is set up. A thin layer of fibrinous exudation is poured out on surface of pleura. This speedily becomes organized. Upon this new tissue another exudation takes place and this in turn receives another, and so layer after layer is formed until the contents of the abdomen become so welded and hidden in the exudation that it is impossible to distinguish anything with certainty. Although tubercles almost invariably exist in the lungs at the same time, it sometimes happens that their symptoms are not well developed, and the phthisis may be far advanced without cough or other rational signs of its existence. As a rule the treatment can only be palliative. (Yet Dr. C. has seen two cases recover.) We know tubercles can be be softened and absorbed. There is no theoretical reason why recovery should not occasionally take place. Fresh air, nutritious diet, cod-liver oil, tonics, stimulants (in moderation), with counter irritation (iodine being preferable), are the chief remedial agents. The afternoon fever may be controlled by quinine and acidi sulph. arom.—ALONZO CLARK.

PERITONITIS, Pelvic—*See Pelvic Peritonitis.*

PERITONITIS, Puerperal—*See Puerperal Peritonitis.*

PERITONITIS, Tubercular—*See Tubercular Peritonitis.*

PERITYPHLITIS.—Since the year 1867, when Dr. Willard Parker happily advocated and adopted the plan of treating perityphlitic abscess by early incision, the procedure has received considerable attention from American surgeons, and the practice recommended by Dr. Parker has been fully endorsed by all who have published the results of their experience. That the disease, however, although by no means uncommon, is frequently overlooked or misunderstood, seems quite certain; and what is known about it has not yet been embodied in the standard surgical text-books, but remains scattered among the pages of our current medical literature. Further discussion of the subject is therefore desirable, in order that the disease may be readily recognized and submitted to appropriate surgical treatment; and in order that those cases in which operative interference is necessary, may be, if possible, distinguished from others, not infrequent, which tend to spontaneous recovery, or which, at least, are likely to terminate favorably without the aid of the knife. My object in the present communication is briefly to present to the Society the results of my own observation of this affection, in the hope of eliciting profitable discussion, and of obtaining such additional information derived from the personal experience of my colleagues, as shall throw light upon several obscure and unsettled points connected with its pathology and treatment. My remarks will refer only to those cases of inflammation in the neighborhood of the cæcum, in which the disease is circumscribed; as those in which general peritonitis rapidly follows a perforation of the cæcum or the vermiform appendix belong to a separate category, and, terminating fatally, are as yet beyond the reach of art, and possess therefore a pathological rather than a surgical interest.

Thus defined, twenty-six cases of perityphlitis have fallen under my notice. Of these, twenty-two were observed in males and four in females, thus confirming the fact already established concerning the comparative rarity of this disease in the female sex. Of the entire number, only one occurred in hospital practice. The youngest patient was nine years of age, and the oldest fifty-four. Of the rest, ten were between ten and twenty, seven between twenty and thirty, two between thirty and forty, and five between forty and fifty.

As is well known, various causes have been assigned by systematic writers for the occurrence of the inflammatory affection under consideration, and a pathological classification of the cases I have seen would doubtless be preferable to any other, provided it could be accurately made. But as in all, except three of them, the disease terminated in recovery, the precise pathological condition could rarely be determined; and therefore I have thought it more profitable to separate the cases into four divisions, as follows:

1. Cases terminating in resolution, without evidence of suppuration.

The first group comprises ten cases, in all of which the disease disappeared without showing any signs of suppuration. Inasmuch as many persons entertain the erroneous notion that perityphlitis, when once established, must necessarily terminate in the formation of abscess, it will be important to dwell on these cases long enough to show that their diagnosis was carefully and fairly made out. In all the following symptoms were present, namely: abdominal pain and tenderness, usually occurring suddenly, sometimes limited to and always most marked in the region of the cæcum; fever, indicated by an acceleration of pulse and a rise of temperature; and the presence of an indurated swelling, distinguishable either by palpation in the right iliac fossa or by digital exploration of the rectum. In most of the cases, the onset of the disease was severe, being characterized by nausea and vomiting, and by acute pain and tenderness in the cæcal region. Sometimes the pain in the abdomen was diffused in the beginning, and became localized only on the second or third day. The temperature was elevated in every case, ranging from 100° to 104° F., in one case reaching 105°. The most striking feature of the disease, namely, the presence of a circumscribed induration in the right iliac fossa, was observed in nine out of the ten cases belonging to this group; while, in the remaining case, the inflammatory swelling could be distinctly felt through the rectum, the finger detecting a firm elastic mass, tender to the touch, and evidently developed from the region of the caput coli. When present in the iliac fossa, the tumor seemed deep-seated, and was invariably situated above and within a short distance of Poupart's ligament. Its external margin often advanced to a point within an inch of the anterior spinous process of the ilium, while internally it seldom reached the median line, in one instance, however, passing two inches beyond it. Its upper limit rarely extended above the cæcum or adjacent part of the ascending colon. In all instances the tumor was deep-seated, immovable, and tender on pressure; and in several the abdominal wall covering the tumor anteriorily was so exceedingly painful to the touch as to render a thorough examination quite difficult. The induration was usually discovered within forty-eight hours after the commencement of the disease, and generally began to subside soon after the abatement of the other symptoms.

It is worthy of notice, however, that in almost all cases the subsidence of the tumor was gradual, and that in one instance, nearly five months elapsed before the disappearance was complete. This fact, coupled with the circumstances that care was always taken to secure a thorough action of the bowels by the administration of purgatives, clearly indicates the inflammatory nature of the tumefaction, and forbids the supposition of the latter being directly due to fæcal impaction in the cæcum. In one exceedingly chronic case, in which the disease lasted for several months, an accumulation of hardened fæces in the cæcum and colon seemed evidently the origin of the inflammatory mischief, which continued, however, long after the exciting cause had been removed. So far as the early symptoms are concerned, these cases could not be distinguished from those that were destined to go on to suppuration. The abdominal pain, the fever, and the gastric disturbance were quite as severe, and the indurated mass occupying the iliac fossa presented the same characters. I have therefore learned to decline, in the beginning of the disease, to express a definite opinion as to the probable ultimate result, since time alone can decide whether the inflammatory process shall be arrested, or advance to the stage of suppuration. Fortunately, the doubt is often solved at an early period, for I ascertain from my notes that in five out of the ten cases resolution occurred as early as the fifth, and not later than the eighth day; while in only one case was it delayed beyond the fourteenth day. The favorable termination was indicated by a decided fall in the pulse and temperature, the latter sometimes dropping below the normal standard, and by a marked diminution of abdominal tenderness, pain and distension. These signs of improvement generally coincide with a decrease of the local tumefaction, traces of which, however, as has been mentioned, often remained long after the establishment of convalescence. In a few instances the tumor subsided so rapidly as to suggest that an abscess had ruptured, although a careful inspection of the urine and fæces failed to detect admixture of either blood or pus.

Regarding the pathology of the cases now referred to nothing very definite can be stated. In one case, impaction of fæces in the cæcum seemed a probable cause; in another, the disease came on after unusual muscular exertion; while in a third, it may have been due to some intestinal lesion accompanying continued fever. In the remaining seven cases, no adequate cause could be discovered. In all, however, the symptoms pointed to plastic inflammation of the connective tissue adjacent to the cæcum as the proximate cause of the characteristic induration which, with a single exception, was found in the iliac fossa. In this exceptional case, in which the inflammatory swelling could be felt only through the rectum, it may be conjectured that the irritation proceeded directly from the vermiform appendix which, instead of being curled up behind the cæcum, lay at, or or below the level of the brim of the pelvis. What proportion of cases were connected with the lodgment of fæcal concretions or for foreign bodies in the vermiform appendix cannot, of course, be determined; but it should be remembered that this morbid condition is the most frequent cause of perityphlitis when the disease culminates in abscess, and that in many of the latter class of cases, there is obtained a history of one or more preceding attacks of a similar character, terminating by resolution. The invariable occurrence of such disease on the right side can be explained only by reference to the cæcum or its appendix as the starting point; and pathological anatomy has demonstrated that lesions of the appendix are relatively more frequent, as well as more dangerous, than those of the cæcum itself.

The treatment of the cases which terminated in resolution consisted *mainly in local depletion,* the application of fomentations or poultices to the abdomen, and the internal administration of opium. Eight or ten leeches were usually applied over the cæcal region; and sometimes the leeching was repeated. The effect was often markedly beneficial. Opium or morphia was given in moderate doses, sufficient to allay pain, but never so as to induce narcotism. Castor oil, fluid extract of senna, or calomel was administered in nearly all cases early in the disease, and I would remark that this practice appears to be judicious for two reasons; first, to afford aid in diagnosis, by excluding fæcal impaction in the cæcum as a possible cause of the symptoms; and secondly, because any accumulation of fæces in the intestines increases the patient's suffering, and is doubtless liable to aggravate the existing inflammatory mischief. The propriety of using cathartics in this affection has been often doubted, and we are taught by some that here, as in the case of general peritonitis, they should be absolutely withheld. But the analogy between the two diseases is not very close, and experience has shown that the fear which has been expressed concerning the danger of cathartics in perityphlitis is unreasonable. Nothing can be gained, however, by their repeated administration; a single purgative, given in the beginning of the disease, will generally suffice to empty the bowels, while subsequent accumulation can be obviated by careful restriction of the diet, and by the selection of light, nutritious articles of food. The treatment thus briefly outlined has been occasionally supplemented by the use of blisters and mercurial applications, whenever the absorption of the inflammatory products appeared to be unduly retarded.

The recognition of the class of cases first described is important, on account of the erroneous opinion widely entertained, that perityphlitis, when once established, must necessarily proceed to suppuration. While this may, perhaps, be true when the disease is due to perforation of the intestine, with the consequent escape of its contents into the surrounding tissues, it is quite exceptional in those cases which owe their origin to the mere presence of hard and indigestible substances in the cæcum or its appendix, to the extension of catarrhal processes in the cæcum through the intestinal coats, to the effects of injury, or to causes which, with our present lack of knowledge, we are unable to define, but yet cannot refuse to acknowledge. Such cases, tending to recovery without suppuration are, as my own experience proves, by no means rare, and their relative frequency is doubtless greater than my figures would seem to indicate, inasmuch as the surgeon is apt to witness the severer, rather than the milder examples of the disease. Since many of them terminate favorably before the end of the first week, the question of the propriety of surgical intervention will often not arise, but when resolution is deferred to the tenth, twelfth or fourteenth day, or even later, it will often require nice judgment to decide whether to operate or not, especially as the surgeon is taught, in doubtful cases, to resort to the knife without waiting to detect fluctuation, and not to delay the incision much beyond the first week of the disease. It must be evident, however, that the question of operation is one that cannot be settled by time alone, and that all the circumstances of the case should be carefully considered before resorting to a procedure which may be needless and possibly hazardous. This subject naturally leads to the study of the cases forming the second group, namely, those of abscess terminating in spontaneous recovery.

I have already remarked that in several cases included in the first series, the subsidence of the local swelling took place so rapidly that it was hard to believe an abscess had not ruptured and emptied its contents into some neighboring hollow viscus. But as an examination of the urine and fæces afforded no evidence in support of such a view, the question was necessarily left in doubt. In three instances, however, my notes furnish conclusive proof that such an event may happen and that it may be followed by complete and speedy recovery. Many years ago I attended a lady afflicted with an abscess in the cæcal region, which, at the end of the second week, was accompanied with alarming symptoms of general peritonitis. Suddenly a large quantity of pus was discharged at stool, and the patient, whose condition had hitherto seemed desperate, became immediately convalescent. In the year 1876, I saw, in consultation with Dr. Pierson, of Orange, a girl nine years of age, who had suffered during the previous eight days with the usual symptoms of perityphlitis. At the time of my visit I discovered a non-fluctuating, tender swelling in the iliac fossa. The severity of the general symptoms as well as the abdominal pain and distension led me to suspect the existence of an abscess, which I succeeded in demonstrating by employing the hypodermic syringe as an aspirator and withdrawing a small quantity of pus. I paid a second visit to the patient on the following day, intending to open the abscess in the usual manner, but found, on my arrival, that the tumor had almost entirely disappeared. I was informed that during the preceding night the child had grown rapidly worse and complained of intense pain in the region of the bladder. Soon afterward she voided a very large quantity of urine, and then at once became quiet and free from pain. Unluckily, the nurse threw away the urine without examining it, but we inferred that the abscess had ruptured into the bladder. In any case, it must have discharged its contents at the time stated, for on the following morning the tumor could hardly be felt, the pulse and temperature had declined to the natural standard, abdominal pain and distension had disappeared, and the patient had evidently passed the crisis. The third case I saw last year in consultation with Dr. M. R. Vedder. The patient was a girl thirteen years old, who had been attacked with perityphlitis a week previously. I found the usual tumor well marked in the iliac fossa, and also unusually prominent in the rectum. A purgative was prescribed which acted freely, and on the ninth day of the disease the swelling almost disappeared, and the fæcal evacuations, on being examined, were seen to contain a notable quantity of blood and pus. In this case the abscess probably broke into the rectum, and, as in the two other instances just related, the patient speedily regained her health.

These three cases prove that even when a perityphlitic abscess is left to itself, its course is not always unfavorable, but that its contents may be discharged into the intestine or possibly into the bladder, without any serious consequences. Indeed, it would appear that this mode of termination is adapted to secure the best possible result, for convalescence begins as soon as the abscess has ruptured, whereas, after an external opening has been established either naturally or by incision, the suppuration is always more or less protracted and the cure correspondingly retarded. Unfortunately we are unable, in any given case, to predict this result, which, moreover, is so exceptional in its occurrence that it does not invalidate the rule of affording vent to the matter by an external incision, so soon as the diagnosis of abscess is reasonably sure.

Cases of abcess treated by operation. This group contains eleven cases, the study of which reveals many interesting facts. The characteristic tumor in the iliac region was present in all the cases, but in only two was any swelling discoverable on digital exploration of the rectum. In four instances there was fluctuation. In one of these the date of operation was not recorded, but it was late in the disease, and the integument was extensively undermined, nevertheless the patient recovered. In the three remaining cases the abscess was opened on the fifteenth day, the seventeenth day, and at the end of the ninth week, respectively. The last named case, in which the operation was so long delayed, terminated fatally by septicæmia. At an earlier stage of the disease, and before fluctuation was evident, I proposed an exploratory incision, but the patient refused to submit to it. When, at last, the abcess pointed over the middle of the crest of the ilium, it had already burrowed extensively and acquired extraordinary dimensions. After being opened it continued to discharge very copiously, and, in spite of the employment of antiseptic injections, septicæmia occurred and carried off the patient. The case is instructive as illustrating the danger of delay, for it is the only one out of the entire number embraced in the present group in which death followed the operation. Had the abscess been opened at an earlier period, a fatal termination would probably have been averted.

In the remaining seven cases that were treated by incision, fluctuation was absent, and there does not appear to have been any one symptom indicating that suppuration had taken place. Yet in only one instance did the knife fail to penetrate an abscess, a circumstance which shows that the diagnosis can be made out with tolerable certainty, even when demonstrative evidence is wanting. Rigor, sweating, high temperature, acceleration of pulse, abdominal pain and tympanites, and an increasing extent combined with diminishing firmness of the abdominal tumor, are the chief signs which indicate the formation of pus. But none of these signs is invariably present, and it would be a difficult matter to say which one of them is the most important. But although in the early stage of the disease it may be impossible to discriminate between the cases that are going to terminate by resolution and those that are to end in suppuration, the latter may usually be distinguished toward the close of the second week by the generally unfavorable condition of the patient, who seems to be growing worse instead of better; whereas, when resolution is about to take place, the later course of the disease is comparatively mild and favorable. In one remarkable case already mentioned, wherein the affection continued for many months and ended without suppuration, the combination of symptoms was never such as to demand surgical interference, although on two occasions I was nearly persuaded to undertake an exploratory operation.

The seven cases now under consideration were treated by incision as follows: one on the ninth day, two on the twelfth day, one on the thirteenth day, and two on the twenty-first day. In all cases except the first, the abscess was found and opened. In the one in which the incision was made on the ninth day, no abscess could be discovered, although the knife was carried through the fascia transversalis, and the hypodermic needle thrust in various directions in the hope of finding pus. After the operation the patient grew worse, and his life was despaired of, when, eleven days later, an abscess broke and discharged its contents through the wound. Perhaps, in this instance, the operation was serviceable by dividing dense structures which might have offered resistance to the progress of matter toward the external surface, but it would, of course, have been more gratifying if an abscess had been reached at once. Usually a perityphlitic abscess remains of moderate size until about the end of the second week, and by deferring an operation until it is ripe, we shall find the deeper textures consolidated and agglutinated by plastic lymph, and, therefore, less liable to be infiltrated by the fetid discharges which, after incision, often cause more or less sloughing of the margins of the wound. On the other hand, the danger that the abscess, if unrelieved, may rupture into the peritoneal sac must not be forgotten. Through the kindness of Dr. Wiener I have the opportunity of showing to the Society a specimen illustrating this unfortunate accident. On Tuesday last, Dr. Wiener was called to see a gentleman who had been ill for six days with perityphlitis. The characteristic tumor was present in the iliac fossa, and the case being regarded as one of abscess, arrangements were made to open the latter on the following day.

During the night, however, in consequence, it is supposed, of some incautious movement made by the patient, rupture into the peritoneum took place, and death ensued ten days afterward. The bursting of the abscess was indicated by a disappearance of the tumor and by collapse, followed by the usual symptoms of acute peritonitis. I believe such an event as this is very rare, but the possibility of its occurrence must make us watchful and anxious until the crisis is passed. Everything depends on an exact diagnosis and on an early recognition and treatment of existing abscess, and I would suggest a more frequent employment of the aspirator as affording the most reliable test at our command for purposes of diagnosis. The smallest needle will suffice, and can be repeatedly inserted if necessary without doing harm. By means of this instrument the situation, as well as the presence of an abscess, can be determined, and it is well known that these collections of matter do not always occupy the same locality.

In every case that has fallen under my observation, the operation has been performed essentially in the manner recommended by Dr. Parker. An incision several inches in length, and usually parallel with Poupart's ligament, was made over the most prominent part of the tumor, through the shin and sub-cutaneous fat. Subsequently the deeper layers were divided until the abscess was reached, or until the fascia transversalis came into view. If fluctuation then became evident, the abscess was immediately opened, otherwise the fascia was penetrated in various directions by means of a hypodermic syringe until the seat of the abscess was discovered, when the operation was completed by entering a narrow bistoury alongside of the needle. I have no doubt that this method of operation, wherein the aponeurotic and muscular layers composing the abdominal wall are successively and cautiously divided, is better than the plan which has been proposed of plunging a bistoury directly into the abscess and then enlarging the wound as the knife is withdrawn. Such a course can only be proper when fluctuation is present, and the matter lies near the surface. Nevertheless, I would avoid the extensive incisions which are sometimes recommended, and which have been known to be followed by hernial protrusion. An external incision of two inches will afford ample space; and the wound should grow narrower as it increases in depth, while the direct opening into the abscess need not be larger than will readily admit the forefinger. This I think it desirable to insert, in order to ascertain the extent of the cavity, and to detect, if possible, the presence of foreign bodies or fæcal concretions. When these are found, they should always be removed; otherwise they may cause future trouble. In a case which I treated by incision several years ago, the patient did well after the operation, and returned to his work. About a month later, however, suppuration recurred, the wounds re-opened, and allowed the escape of a small fæcal concretion, the discharge of which was followed by a permanent cure.

Concretions were found in four out of the eleven cases treated by incision. One of them was large, and resembled in size and shape a date pit; the others were small, and, like the large one, consisted of inspissated fæcal matter, arranged in the form of concentric laminæ. One of them contained a few raspberry seeds, and in one instance, eight concretions, evidently formed in the appendix, were obtained from a single patient. Probably similar formations existed in other cases, but were overlooked and thrown away with the discharges. The contents of the abscesses were always exceedingly fetid, had a fæcal odor, and were more or less gaseous, rendering it probable that the intestine had been perforated. It is not a little remarkable that these perforations of the intestine, evident in some instances, and probable in all, invariably closed, for in no case did a fistulous track remain as a sequel of the operation. In the earlier cases the abscesses were kept clean by daily injections of tepid water; in the later ones a drainage tube was inserted and the injection made antiseptic by the admixture of carbolic acid.

My notes contain several cases in which perityphlitis occurred more than once in the same patient. In one of these the second attack, which terminated by resolution, took place thirteen months after a successful operation for abscess. No concretion or foreign body was found at the time when the abscess was opened, and it is possible that the retention of some such extraneous substance may have caused the subsequent trouble. This supposition is favored by the history of two other cases given in the table, in one of which there had occurred withln a period of two years no fewer than three attacks of perityphlitis, the last one only ending in abscess. In the other patient an abscess formed two and a half years after a sharp attack of perityphlitis, terminating in resolution. In both, fæcal concretions were discharged from the abscess; and it is fair to presume that these had been the cause of the previous attacks. Such cases teach us that we should be guarded when giving a prognosis respecting the liability to a recurrence of the disease, after recovery has taken place by resolution. If the appendix contains a concretion, this will probably excite renewed irritation until the offending substance is discharged by suppuration.

In opening perityphlitic abscesses, in which fluctuation could not be detected, I have always proceeded with caution, for fear of wounding the peritoneum or the intestine; but I am doubtful whether such caution is absolutely necessary. Whether in consequence of the fact that these abscesses contain gas, or because they are adjacent to the intestine, they often yield a tympanitic sound on percussion, giving one the impression that the intestine is close at hand. But I have never observed this to be the case on opening the abscess, which is frequently so large that the forefinger inserted into it can barely touch the cæcum, displacing from its normal situation toward the median line.

It is generally assumed that when abscess results from perforation of the appendix, the matter is contained in the peritoneal sac, a portion of which is shut off from the rest by adhesions between the intestines, the parietal peritoneum, or the omentum. That the abscess may be thus constituted I am well aware; but I believe that such a mode of origin is quite exceptional, and that when, in consequence of intestinal perforation fæcal matters escape directly into the peritoneal cavity, the result is almost invariably a diffused septic inflammation of the peritoneum, ending in speedy death. Pathological anatomy has shown the possibility of another mode of abscess-formation, which I believe to be far more common. The vermiform appendix, before becoming perforated,may contract adhesions to the peritoneum lining the iliac fossa, on which it usually rests. Consequently, when the coats of the appendix have been destroyed, the ulceration extends through the opposed layer of peritoneum in such a manner, that the fæcal matters, instead of entering the serous sac, gradually pass into the loose connective tissue which lies outside the peritoneum, and there set up suppurative inflammation. The pus, as it accumulates, may burrow behind the cæcum and ascending colon; or it may descend behind the peritoneum into the pelvis; or, as most often happens, it may occupy more or less completely the iliac fossa. In the latter case, the serous membrane, which is here very loosely adherent to the iliac fascia, will be detached and deflected toward the median line, carrying with it, in the same direction, the cæcum and the small intestine. Here there will be little danger of wounding the peritoneum while opening the abscess, provided the operator avoids the upper and inner margins of the tumor, where the serous membrane forming the boundary of the abscess is reflected upon the anterior abdominal wall. Of course, in the event of an erroneous diagnosis, grave accidents might occur, for an incision which, in the case of abscess, would simply enter the suppurating cavity, might otherwise penetrate the peritoneal sac, and perhaps also involve the intestine. The aspirator offers, as has been stated, the best safeguard against such a blunder, and should invariably be employed in doubtful cases.

I have but few words to add concerning the fourth and last group of cases, those in which the abscess terminated fatally, without discharging its contents either internally or externally. This group comprises only two cases, both of which possess features of interest. One of them I saw six years ago, in consultation with Dr. Smith Ely, of Newburgh. The patient was a gentleman forty-eight years of age, who after having suffered for some time with the symptoms of inflammation in the region of the cæcum, was siezed with general peritonitis. At the time when he came under my observation, I found the abdomen greatly distended, but could discover no tumor in the iliac fossa or in the rectum. He declined to submit to the usual exploratory operation, but allowed me to cut through the skin and the thick subcutaneous fat, and to insert the needle of a hypodermic syringe into the deeper tissues. This was done with a negative result. Death occurred from peritonitis, and a post-mortem examination revealed an extensive abscess behind the cæcum and ascending colon, reaching as high as the under surface of the liver, and communicating with the intestine through an ulcerated opening in the posterior wall of the cæcum. The abscess was filled with pus and blood, and did not open into the peritoneum. The veriform appendix was intact. This case, as well as the one I am about to relate, shows that a perityphlitic abscess may be situated altogether behind the colon, and suggests the propriety of inserting an aspirating needle through the posterior wall of the abdomen, when the symptoms of perityphlitis are present without the development of the usual iliac swelling, Should matter be found, it could then be evacuated by an incision like that usually made in the operation of colotomy,

The second patient, a gentleman forty years of age, I saw in consultation with Drs. Rodenstien and Otis. The history of the disease pointed clearly to perityphlitis, but there was no tumor. Digital exploration of the rectum failed to discover any swelling, but detected slight tenderness high up on the right side. On the fourth day the patient became somewhat delirious, and on the sixth day he had a convulsion. From that time until his death, which took place on the sixteenth day, the symptoms were those of cerebral inflammation, the patient dying comatose. A post-mortem examination discovered the changes in the brain characteristic of purulent meningitis; and the disease in this case seemed to be pyæmic, for, on opening the abdomen, an abscess containing eight ounces of fetid pus was found situated in the lumbar region, behind the cæcum and ascending colon. The abscess communicated with the vermiform appendix, which was the seat of a double perforation. No tumor existed in the iliac fossa. There were no evidences of peritonitis except the presence of some adhesions connected with the appendix.

The early supervention, in this case, of acute cerebral inflammation would have prevented the success of any surgical operation, even had the situation of the abscess been known during life. But the case is instructive as showing that a perforating ulcer of the appendix, like a similar ulcer in the back of the cæcum, may give rise to an abscess in the lumbar region that cannot be discovered by the ordinary method of examination.—HENRY B. SANDS.

PERTUSSIS—*See Hooping Cough.*

PESTILENCE, Hæmogastric—*See Yellow Fever.*

***PESTILENCE,* Septic or Glandular**—*See Plague.*

PHAGEDENA—*See Ulcers and Syphilis.*

PHARYNX, Diseases of.—Its chief affections are inflammation, abscess, tumors, epithelioma, syphilitic, disease, ulceration, wounds and presence of foreign bodies.

Congenital Discontinuity of Pharynx and Œsophagus.—A complete monograph on this, by Ilott of Bromley, is in *Path. Transact.* for 1876.

Acute Diffuse Pharyngitis.—Highly dangerous. Usually spreads from fauces. Dyspnœa, dysphagia. Great swelling, internal (and often also external). Progress rapid. *Termination.*—Usually death, in a few days, either suddenly or with signs of sinking. *Pathology.*—Inflammation of cellular tissue of pharynx and œsophagus ; great œdema ; often suppuration. *Treatment.*—Supporting, stimulating. Enemata. Quinine. Laryngotomy to avert danger of suffocation.

Post-Pharyngeal Abscess.—*Cause.*—Often caries of cervical vertebræ. Most dangerous in children, because then may not be diagnosed until it has produced suffocation. May open externally in neck. *Treatment.*—Puncture with an abscess knife having its blade, except near the point, protected by lint. Finger may be used as a director.

Ulcers of Pharynx, usually syphilitic in adults and sometimes strumous in children. *Treatment.*—*See* Treatment of Syphilis and Scrofula.

Dilatations and Pouches of Pharynx occur. Food is apt to lodge in them. Diagnose by the history given by the patient. Regurgitation sometimes occurs, or patient may be able to empty the pouch by external pressure. Secondary laryngitis may occur.

Pharynx, Foreign Bodies in.—*Vide* Œsophagus.—C. B. Keetley.

PHARYNGITIS.—Inflammation of the textures of the pharyx may be either acute, sub-acute or chronic. Acute pharyngitis is generally met with in association with a similar condition of the fauces, and is very rarely seen alone. The form of inflammation is most frequently œdematous, occasionally extending to the larynx, and hence its danger. The symptoms are, great pain and difficulty of swallowing, with more or less dyspnœa of the swelling extends over the windpipe ; when the larynx is affected the symptoms are those of œdematous laryngitis, and with the laryngoscope, that part of the pharynx which can be seen will appear red and ædematous.

Chronic pharyngitis is of three forms : (1.) Granular ; (2.) follicular ; and (3.) herpetic.

Treatment should consist in hot steam inhalations of a sedative character, poultices externally, and scarification if œdema takes place. In those cases in which the uvula is much swollen and infiltrated with serum, it should be at once removed. Tonics, such as iron, quinine and strychnia are mainly indicated. Locally, in the granular form, astringent solutions, such as zinc and iron, may be applied either with the brush or in the form of an atomized inhalation. Gargles are of no use when the disease is situated behind the anterior pillars of the fauces ; but lozenges are most serviceable in all forms of pharyngeal disease. Those of tannin, rhatany and kino are very beneficial in granular pharyngitis. In follicular pharyngitis the spots should be scraped, the secretion emptied, and solid nitrate of silver applied to each diseased follicle. Lozenges of chlorate of potash and of bitartrate of potash are useful in stimulating the follicular secretion to a healthy condition. In herpetic pharyngitis the raised papules must be destroyed by equal parts of caustic, soda and unslaked lime, which is mixed with water, as required, into a creamy paste, which should be applied to each papule with a finely-pointed glass of aluminum rod. The caustic effect of this application is instantaneous. The patient should therefore be always directed to wash his mouth with water immediately after the application, so as to prevent any other part of the throat being burnt by contact with the caustic. In all cases of pharyngeal disease, every form of spice, pepper, mustard. and piquant food should be strictly prohibited, and all fluids should be taken at a moderate temperature.—WILLIAM AITKEN.

PHIMOSIS—*See Penis, Diseases of.*

PHLEBITIS—*See Veins, Inflammation of.*

PHLEBOLITHES.—Some veins not infrequently contain loose calculi or phlebolithes, generally round or oval, and sometimes attached by a narrow pedicle to the inner wall. No inconvenience results from their presence. They are found most frequently in the veins of the pelvis about the bladder and prostate, especially when the latter is enlarged.

Their origin has been much questioned. Bichat [*] thought that they occurred in veins exposed to slow circulation of their contents. Hasse found them connected with varices. Hedgson [†] held that they were probably formed in surrounding parts, and made their way into the veins by absorption. Cruveilhier stated that they were developed in the centre of a clot of blood. It is, however, most probable that they are clots which have thus dried up and become transformed. Having protruded from some small branch, they receive additions to their surface, and, eventually separating from the pedicle which held them to their original vessel, shift their situation, and are perhaps rolled along for some distance by the blood-stream before being finally arrested.

They are formed of concentric layers, which consist, according to an analysis kindly made for me by my friend and colleague, Dr. Frankland, of protein matters and phosphate of lime. The former, constituting about twenty per cent. of the calculi, are nearly all albuminous or fibrinous; the latter, though mainly phosphate of lime, is mingled with a little sulphate of potash and sulphate of lime. That is to say, the phlebolithes consist, as might be expected, of the coagulated protein constituents and the less soluble salts of the blood.—GEO. W. CALLENDER.

PHLEGMASIA DOLENS.—*Definition.*—Peripheral venous thrombosis; white leg; the formation of thrombi in the veins of the lower extremities.

Causes.—Puerperal blood dyscrasia, resulting in the formation of clots in the veins with probable accompanying obstruction of the lymphatics; or a result of embolism, a clot being carried into the circulation until it blocks some vessel.

Symptoms.—Severe pain in some part of the leg, especially in the course of the chief venous trunks. It may begin from above or below. On the limb swelling, the pain usually abates. Restlessness, rigor.

Signs.—Pulse rapid, temperature nigh, tongue coated, bowels constipated. The leg is greatly swollen, more usually the thigh, or it may affect the leg or the whole limb. The veins are felt to be hard and painful, and their course marked with red. The swelling is hard and tense, does not readily pit, and is whitish.

Diagnosis.—From œdema by severity of the pain, by the absence of or nearly so of pitting. by the feel of the blocked veins.

Prognosis.—Not unfavorable; recovery takes place slowly, the constitutional disturbance abates, the swelling diminishes, and absorption com, mences. Suppuration may take place or an embolus may be thrown off and pulmonary or cerebral obstruction happening, sudden death may result.

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[*] *Anat. Gén. par Beclard, p. 104.*

[†] *Dis. of Arteries, p. 511.*

Treatment.—Leeches very rarely, and only in cases where the patient is plethoric and there is much tenderness and redness along the veins; wrap the entire limb in continuous linseed poultices. Fomentations with opium or belladonna; light, nutritious diet; chlorate of potash, hydrochlorate of quinine, perchloride of iron, Dover's powder; hypodermic injections of morphia. Avoid friction of the limb, for fear of dislodging an embolus.—HEYWOOD SMITH.

PHOBOPHOBIA—*See Fear, Morbid.*

PHRENITIS—*See Brain, Inflammation of.*

PHTHIRIASIS.—*Definition.*—A diseased condition of the skin produced by the attacks of lice.

Symptoms.—Three species of lice infest the human body—pediculus capitis, restricted to the hairy scalp; pediculus pubis, found about the genitals, and occasionally on the margins of the eyelids, beard, and axillæ; and pediculus corporis, or vestimenti, chiefly affecting the trunk.

In pediculosis capitis, produced by the presence of pediculi capitis, the lice are found wandering about the roots of the hair, most abundantly on the occipital and temporal regions, and more frequently in women and children than in male adults. They excite intense itching by thrusting their probosces into the hair follicles and sucking blood from the capillaries, and soon, owing to the scratching which results, excoriations, eczematous eruptions, and crusts appear. The hair becomes matted, foul-smelling, and covered with adherent "nits" or ova; the glands in the anterior triangle and at the back of the neck frequently swell and even suppurate, and excoriated spots and boils often appear on the nape of the neck.

In pediculosis pubis, the crab lice, as they are termed from their shape, anchor themselves firmly to the roots of the pubic hairs, and by their sucking produce itching and follicular irritation, which excites scratching and thereby causes excoriations and eczema. The lice are seen as little grayish specks adhering to the bases of the hairs, and are mostly found in adults.

Pediculosis corporis, occurring mostly in elderly persons, like the previous affection is excited by lice, which, however, are rarely visible on stripping the patient, as they inhabit and deposit their ova in the folds of the under-clothing and the interstices of flannel garments worn next the skin. Thrusting their probosces into the hair follicles, they wound the capillaries and produce minute hæmorrhagic specks, surrounded at first, like fleabites, by a hyperæmic zone. These spots are the seats of intense itching or creeping sensations. Violent scratching ensues; the cuticle is torn off over the parts affected, and excoriations are produced, covered by scabs of dried blood. Papular, urticarial, eczematous, and furuncular or pustular eruptions are usually excited in the same way, and in old-standing cases the skin becomes deeply pigmented and covered with scabs, which are most numerous about the shoulders and the front of the chest beneath the clavicles. This eruption was formerly named prurigo senilis, and is not pathognomonic of pediculi in itself, being capable of production by any intense itching, but its restriction to certain sites and the presence of hæmorrhagic puncta determine tha diagnosis.

Diagnosis.—In peliculosis capitis the presence of the "nits" or ova—small whitish, semi-translucent bodies—firmly adherent to the hairs, and the discovery of the parasites near their roots or attaching to the comb, settles the question.

In pediculosis pubis the parasites adhere to the roots of the hairs, and have the appearance of little grayish or brownish scales, which when pulled off with forceps often tear out the hair to which they cling.

In pediculosis corporis the lice must be looked for on the folds of the under-clothing, about the junctions of the sleeves with the body, and under the collar of the shirt. The restriction of the "pruritic rash" to the shoulders and infraclavicular region, and the presence of hæmorrhagic puncta, may occasionally, when, from the under-clothing having recently been changed, no pediculi can be found thereon, lead to an accurate diagnosis.

Prognosis.—Pediculi, if untreated, may increase and multiply for years, causing eczema, pruritic eruptions, glandular enlargements, abscesses, etc. Under appropriate measures, however, they are readily exterminated, and the eruptions excited by them subside either spontaneously or under ordinary treatment in a short time.

Treatment.—The full-grown lice are easily destroyed by a carbolic lotion (1 to 20), or by the inunction of dilute ammonio-chloride, red precipitate ointment, oleate of murcury 5 per cent., or ung. hyd. c. sulph. As the ova are not readily attacked by these remedies, they must be applied for a week or ten days, so as to destroy the young lice as they become hatched.

For pediculus pubis, ung. staphisagriæ, scented with oil of lavender or roses, is a very valuable application.

Pediculus corporis should be treated by warm baths, thorough change of clothing, and baking the old garments in a disinfecting oven at a temperature of 250°–300° Fahr., so as to destroy the lice or their ova.

Itching may be mitigated by soothing alkaline or prussic acid and glycerin lotions, and any eczematous or other eruptions treated on general principles.—MALCOLM MORRIS.

PHTHISIS PULMONALIS.—Unquestionably several distinct affections are included under the term pulmonary phthisis, all of which, however, tend to produce similar results, viz., consolidation followed by destruction of the lung-texture; and wasting of the blood and tissues of the body. In this work little more can be done than to give an outline of the main facts and theories relating to this extensive and difficult subject.

Etiology.—The causes which may directly or indirectly contribute to the development of phthisis are numerous and varied. It is not practicable to divide them into predisposing and exciting, as most of them may under different circumstances belong to either class. The chief causes may be indicated under the following headings: 1. Hereditary or family predisposition. There can be no doubt as to the existence of an inherited tendency to phthisis, but the proportion of cases in which this is traceable has been very differently stated by different observers. Further, many consider that a specific diathesis is thus transmitted, whereas others believe that it is merely a constitutional debility, and that this may be present in children born of parents in a low state of health from any cause, as well as in those derived from consumptive parents. 2. Age. Most cases of phthisis are met with from twenty to thirty years of age. The disease is not often observed during early childhood or in advanced age, but may come on at any period of life. It is usually more rapid in its progress in young subjects. 3. Constitutional condition. Persons who are feeble and delicate are most liable to be affected with pulmonary consumption. 4. Occupation. Phthisis is very common among those whose employment exposes them to various irritant inhalations; to causes originating a cold; or to the influence of certain unfavorable hygienic conditions. 5. Habits. Sedentary habits and want of exercise, intemperance, masturbation, excessive sexual indulgence, and debauchery generally, are the chief causes of phthisis coming under this head. 6. Diet and digestion. The malnutrition resulting from an imperfect supply of nutriment to the system, to whatever cause this may be due, has a powerful influence in developing phthisis, especially in the young. This may be associated with an insufficient amount or improper quality of food; or with a want of power of assimilation, on account of dyspepsia or of various diseases interfering with digestion. Some writers have laid great stress on a deficiency of fat in the system as a cause of phthisis, either from want of supply of this element, or because it cannot be digested. 7. Interference with respiratory functions. Want of ventilation and fresh air, and the consequent breathing of an impure atmosphere, materially assists in the production of phthisis; hence the complaint is common among those whose occupation compels them to remain in a close, confined room for many hours during the day, as well as in many instances during the night, such as seamstresses or tailors. It is also frequent in ill-ventilated institutions where many persons are gathered together, especially children, for example orphan asylums and prisons. Whether interference with the respiratory movements, due to pressure of stays or to posture, has any effect in the production of phthisis, is a matter of dispute. Dr. MacCormac attaches great importance to "rebreathed air" as a cause of consumption. 8. Climate and locality. Dampness of soil, and abundant moisture in the atmosphere, have been proved to be powerful predisposing causes of phthisis. Dr. Buchanan has shown that efficient drainage has materially diminished its prevalence in certain districts. The affection is most prevalent in those climates characterized by rapid changes of temperature, or by prolonged cold with dampness. The tubercular form of consumption is said to be favored by a high temperature. Elevated regions are remarkably free from phthisis, while those which are situated at a low level present a large number of cases. It has been stated that malarial districts are comparatively exempt from the disease. 9. Mental causes. Severe mental depression, as from anxiety, grief, or overstudy, certainly seems to have considerable influence in some cases in originating phthisis. The complaint is not uncommon among the inmates of lunatic asylums. 10. Previous and existing diseases. Phthisis may follow measles, hooping cough, croup, typhus, typhoid, scarlatina, and other acute diseases. Repeated attacks of bronchitis greatly favor its development; and it may also result from pneumonia, especially the catarrhal form, from pleurisy, and probably from laryngitis. Under this head may be mentioned miscarriages, bad confinements, prolonged lactation, continued or excessive discharges, or the suppression of such discharges, all of which certainly increase the tendency to consumption. It is liable to set in during the course of diabetes, as well as in connection with diseases of the alimentary canal and other parts which interfere with the consumption or assimilation of food. Dr. Pollock has remarked that young women who are anæmic or chlorotic are peculiarly free from phthisis, but the complaint does sometimes attack such subjects, and may come on very insidiously. 11. Infection. It has been imagined that consumption is capable of transmission by infection through the breath, or by eating the flesh of animals who have been subjects of phthisis, but the evidence in support of either of these modes of origin is extremely unsatisfactory.

Such are the principal obvious causes which may lead to phthisis. They may be separated into two groups as regards their mode of action; the one tending to induce a low and unhealthy state of the system, the other to excite local irritation in connection with the pulmonary organs. In the great majority of cases it will be found that several causes have been at work in originating the disease, and often there is a combination of both classes. With regard to the immediate origin of phthisis, it may or may not be traceable to some definite exciting cause, such as a cold or other source of pulmonary irritation.

Pathology.—Until within the last few years phthisis was almost universally looked upon as essentially a tubercular disease, depending upon the deposit and ultimate breaking down of tubercle in the lungs, causing destruction of their tissues, with the consequent formation of cavities. The importance of inflammatory processes in the production of this disease had been recognized by a few observers, such as Addison, Williams, and others, but it is only within a comparatively recent period that they have been assigned the prominent position which they now occupy with many pathologists, and which they have attained to a great extent through the advocacy of the late Niemeyer. There is still, however, a very wide difference of opinion upon this subject. Most recent writers on pulmonary consumption in this country are in favor of the inflammatory origin of the disease in many cases. Some still hold exclusively to the tubercular theory, while in France, Charcot and other authorities, returning mainly to the opinions held by Laennec, have come forward as strong supporters of this view. In my opinion phthisis has undoubtedly different modes of origin, and in the following remarks an attempt will be made to indicate the various ways in which the consumptive process might arise, in accordance with the principal views now entertained.

1. *Inflammatory Forms of Phthisis.*—(i.) A comparatively few cases of phthisis result directly from an attack of acute croupous pneumonia, especially if this should affect the apex of the lung, the inflammatory products undergoing a process of caseation instead of being absorbed, and ultimately breaking down, thus leading to disintegration of the pulmonary tissue. It has been suggested by Dr. C. J. B. Williams that a continued high temperature and other agencies may have the effect of hardening the cells in the exudation, in this way lowering their vitality, and preventing their development or removal. Acute pneumonia may also originate phthisis by terminating in the formation of abscesses or in gangrene. It must be noticed, however, that Charcot denies that phthisis ever originates in acute lobar pneumonia, and he affirms that none of the reputed cases correspond anatomically or clinically with this disease.

(ii.) Catarrhal pneumonia, either acute or chronic, is the variety of pulmonary inflammation to which Niemeyer attributed the origin of the large majority of cases of phthisis, and he believed that this might arise under the following circumstances: *a.* As the result of extension of a simple acute or chronic bronchitis into the air-vesicles. He was of opinion that this might occur in a person constitutionally strong, but that it is more liable to happen in the case of those who are debilitated and in a low state of vitality, and that the products are in such subjects more likely to undergo the destructive processes to be presently mentioned. Most cases of acute or galloping consumption were attributed by him to catarrhal pneumonia, complicating extensive acute bronchitis. *b.* From inflammation set up in collapsed lobules associated with bronchial catarrh, as after measles or hooping cough. *c.* By extension of inflammation due to the inhalation of irritant particles into the air-vesicles, in connection with certain occupations. *d.* As the consequence of the irritation of blood poured out into the bronchial tubes, which, instead of being expectorated, has remained and become coagulated, subsequently setting up catarrhal inflammation. Catarrhal pneumonia may also be set up in lungs which have become partially collapsed or compressed from various causes, and where secretion from the bronchial tubes accumulates in these organs.

Niemeyer's explanation of the destructive changes is as follows: Cells, the products of inflammation, accumulate in the alveoli and minute bronchi, crowd upon each other, becoming densely packed, and thus by their mutual pressure they bring about their own decay, as well as that of the lung textures, by interfering with their nutrition, the alveolar walls being also themselves damaged by the inflammatory process. The morbid materials therefore become caseous, and may undergo calcification or absorption, or be ultimately discharged, giving rise to cavities.

Different observers have described special forms of pneumonia as leading to phthisis, which they designate by such terms as albuminous, scrofulous, tubercular, or caseous, but Niemeyer denied that the inflammation has ever any specific characters, and affirmed that all varieties may end in caseous degeneration and consequent phthisis. My own experience is decidedly in favor of Niemeyer's views on this point.

(iii.) It is highly probable that some cases of phthisis originate in inflammatory changes chiefly implicating the walls of the alveoli and the minute bronchioles, with their surrounding tissues.

(iv.) Chronic interstitial pneumonia leads to destruction of the lung, and, as already mentioned, this morbid condition is termed fibroid phthisis. It is observed to a greater or less extent in most phthisical lungs, where the disease is chronic. In the large majority of cases the fibroid condition is secondary, and is an evidence of a disposition towards healing, but Dr. Andrew Clark looks upon it as a special form of phthisis in some cases, the growth of fibroid tissue being primary.

2. *Phthisis from New Growths.*—(i.) The usual new growth which originates phthisis is tubercle. Niemeyer held that primary tubercular phthisis is rare, and that when tubercle is found in the lungs, which he affirmed is by no means always the case in consumption, it is as a rule secondary to caseous degeneration of inflammatory products, being formed chiefly in the neighborhood of these materials; or, should it be primary, some cheesy masses or other sources of infection will be found in other parts of the body. He considered that acute deposit of tubercle in the lungs is more likely to occur as a primary event than chronic; that primary tuberculosis is observed with greater relative frequency in those who are predisposed to inflammation ending in caseous degeneration; that the greatest danger for most consumptives lies in their liability to become tuberculous; and that though tubercle may give rise to pneumonia, this is far less extensive than when the inflammation is the original mischief.

On the other hand, as has been already stated, many eminent authorities will not accept these views, but maintain that the formation of tubercle is the first step in the consumptive process in most or in all cases, and that this morbid product undergoes degenerative changes, while at the same time it sets up irritation and excites inflammation; in short, that as a rule phthisis is essentially a constitutional tubercular disease.

In this connection Charcot's views demand special notice. As the result of his own investigations, in which he examined phthisical lungs under a high power of the microscope, he ignores entirely the inflammatory origin of phthisis, and holds that the disease, whether acute or chronic, begins in the formation of tubercular nodules or agglomerations. He puts the matter thus strongly: "Nothing, to my mind, is better established than the existence of infiltrated or discrete tubercle, as a fundamental element in the different forms of pulmonary phthisis. On the other hand, nothing is more doubtful than the existence of caseous pneumonia, independent of tuberculosis, and constituting the prime agent in the phthisical process." This observer denies altogether that the so-called caseous degeneration, ending in yellow consolidation, is the result of the metamorphosis of the products of ordinary inflammation, but that it always begins in the centre of a tubercular nodule or agglomeration, growing at the expense of the "specific embryonic neoplasm," infiltrating the wall of the alveoli, and afterwards invading their cavities. He maintains that the products of common inflammation are only present as a secondary result of the morbid changes, and if they are intermingled with tubercular nodules undergoing caseous degeneration, they will become involved in the process, but their implication is a purely secondary and subsidiary part of it.

It cannot be doubted at any rate that many of the morbid conditions described as tuberculous infiltration are not associated with tubercle at all, but are inflammatory in their origin.

(ii.) Under the class of new growths originating phthisis have been included those rare cases of destruction of lung tissue which apparently result from breaking down of syphilitic gummata. Some writers also consider hydatid disease of the lung as a form of phthisis. These morbid conditions will, however, be separately considered in this work.

3. *Vascular Obstruction.*—Occlusion of branches of the pulmonary artery probably contributes to the destructive process in some cases of phthisis. The decay which occurs in pneumonia or tubercle is usually believed to be mainly due to compression of the vessels. A recent writer, Dr. Reeves, has described a special variety of the disease observed in Australia, originating in embolism of the pulmonary branches, and consequent localized gangrene of the lung.

It is highly probable that phthisis may originate in different cases in either of the ways above indicated. Unquestionably a large number of them are attributable to local causes acting upon the pulmonary organs, which tend to excite some form of inflammation, and catarrhal pneumonia certainly does seem to be frequently the primary morbid condition which leads to the destruction of the pulmonary tissue. It must, however, be borne in mind that tubercle may result from direct irritation, and it may be thus produced along with pneumonia. Moreover, one condition may soon set up another, and so the destructive process may be of a complex nature from the outset, or from a very early period.

Having thus far considered the etiology and pathology of phthisis generally, it will be expedient in the subsequent treatment of the subject to give a separate account of the disease, as it occurs in its acute and chronic forms.

I. ACUTE PHTHISIS—GALLOPING CONSUMPTION.—*Anatomical Character.*—Now and then the post-motem examination merely reveals to all appearance the remains of an acute croupous pneumonia, which has ended in destruction of the lung tissue. More frequently there are evidences of extensive bronchitis with catarrhal pneumonia, which may invade large tracts of lung tissue, the products being soft and caseous, and easily breaking down, or irregular cavities of various sizes having formed here and there. The lower lobes are usually most involved, but acute inflammatory phthisis may begin in the upper lobes, and spread downward, or be disseminated. Sometimes a whole lobe, or even the greater part of a lung or of both lungs, becomes rapidly destroyed. Signs of more or less extensive pleurisy are also observed, generally indicated by deposit of lymph on the pleural surfaces, or by adhesions. In other instances the pulmonary affection is but a part of acute tubeculosis, the lungs in common with other organs, being studded throughout with gray miliary tubercles, at the same time being much congested and œdematous, especially in dependent parts, but not pneumonic. Caseous matter will then generally be found, either in the lungs or elsewhere. It must be mentioned, however, that some writers object to this form of disease being regarded as acute phthisis. Charcot has described tubercle as being present in the lungs in cases of acute phthisis which he examined, and which appeared to be simply of a broncho-pneumonic character. On examining the nodules microscopically under a high power, he found that they consisted of a central region undergoing caseous degeneration, surrounded by a zone mainly composed of a peculiar embryonic tissue, filling the cavities of the alveoli and infiltrating their walls. The outer boundary of this zone was irregular, and in it were habitually found giant-cells, sometimes disposed in regular order, and completely surrounding the central zone. *Symptoms.*—The clinical history of acute phthisis is that of a febrile disease which is attended with prominent pulmonary symptoms, and, as a rule, with signs of consolidation and subsequent destruction of portions of the lungs, either progressively advancing, or assuming a disseminated character. It may attack a person previously healthy to all appearance, but this is not usually the case. Hæmoptysis is sometimes the first symptom noticed. The course is in some instances extremely rapid and virulent, but any case of phthisis ending within a few months would be considered acute. When acute phthisis originates in croupous pneumonia, it is indicated by a continuance of the chest symptoms and fever with abundant sweats and wasting; while the physical signs show persistence of the consolidation, followed by softening and the formation of cavities. When associated with broncho-pneumonia, the local symptoms include pains about the chest, considerable dyspnœa, frequent cough, and abundant expectoration, which may be "rusty." There is considerable pyrexia, especially at night, accompanied with much sweating, repeated rigors in many cases, rapid wasting, and great debility. Physical signs at first reveal merely the presence of bronchitis. Afterwards there will be indications of consolidation, softening, or excavation in various parts, these being often most marked towards the bases, namely, dulness, bronchial or hollow breath-sounds, crackling, followed by large, moist, and often ringing or metallic rales, and increased vocal fremitus and resonance. Pleuritic friction-sound is also heard in many cases. In the acute tubercular form the symptoms are those of very high fever, with intense prostration and adynamia, as described under acute tuberculosis; there being also extremely hurried breathing and cough, but no marked physical signs in connection with the lungs, only rales significant of pulmonary catarrh and subsequently of œdema being observed. There may be evidences of tubercle in other parts. *Diagnosis.*—This subject will be considered in a future chapter; at present it is only necessary to mention that care must be taken to avoid confounding acute phthisis with certain specific fevers, and especially typhoid.—*Prognosis.*—Acute phthisis is a very grave complaint, and according to the ordinary definition of the disease it invariably ends fatally. At the same time cases do occur in which all the clinical phenomena resemble those which are observed in the pneumonic form of phthisis, but recovery ensues. Such cases have been brought forward by Dr. McCall Anderson in his *Clinical Lectures*. Moreover, phthisis may set in very acutely, and afterwards subside into a chronic form of the complaint. Acute tuberculosis may be regarded as always fatal in its termination. *Treatment.*—According to the nature of the disease, the treatment of acute phthisis will either be that of ordinary pneumonia, of extensive bronchitis with catarrhal pneumonia, or of acute tuberculosis. All kinds of lowering measures are to be avoided, and a supporting and stimulating plan of treatment is invariably indicated. If there is high fever, full doses of quinine may be given, and the application of cold employed with due precautions. Various symptoms, such as pain, cough, dyspnœa, hæmoptysis, sweating, and sickness, often need attention. Local applications to the chest, in the form of poultices, sinapisms, turpentine fomentations, or blisters, are frequently serviceable. Dr. McCall Anderson treated successfully some cases of apparently acute phthisis by free support and the administration of brandy; the application of flannels wrung out of iced water over the abdomen at intervals, for half an hour at a time; the administration of pills containing quinine, powdered digitalis, and opium; and the subcutaneous injection of atropia, to check the sweating.

II. CHRONIC PHTHISIS.—*Anatomical Characters.*—The appearances di-

rved in the lungs in connection with chronic phthisis vary greatly in
fferent cases, according to the nature of the destructive process, the
anges which have taken place during the progress of the disease, and
e other morbid conditions with which it is so frequently associated. As
rule, but not always, the mischief begins and is most extensive and ad-
nced at the apex, the entire upper lobe becoming then progressively
volved from above downwards, and subsequently the lower lobe, so that
e morbid changes are seen in varions stages, often retrograding in one
rt while extending at another, and they may be of a different nature in
fferent portions of the lungs. In persons who die of phthisis, both lungs
e usually implicated to a greater or less extent, though not equally. The
sease, however, usually commences in and may be limited to one lung,
even to a small portion of it, and may undergo curative changes, so that
ien the patient dies from some other cause, evidences of former pulmo-
ry mischief are observed. The primary morbid condition in the de-
lopment of phthisis is consolidation of some kind. This may originally
esent the characters of the ordinary gray hepatization of pneumonia, but
ly in very exceptional cases; of, most commonly, a gelatinous-looking
filtration, grayish, homogenous, and smooth on section, at first limited to
bules, but afterwards involving the pulmonary tissue extensively, and
pposed to be due to catarrhal pneumonia or infiltrated tubercle, accord-
g to the view entertained with regard to its pathology; or of gray miliary
bercles, either separate or, more frequently, collected in groups. The
rmation of true tubercle is probably in the large majority of cases a
condary process, but may be primary, and it is produced either in the
rivascular sheaths, in the walls of the air-vesicles, in the mucous mem-
ane of the bronchi, or in the neighboring adenoid tissue. The tendency
all these morbid products is to undergo caseation and subsequent dis-
tegration to a variable degree and extent, either rapidly or gradually.
s a result of these changes considerable alterations in their aspect and
aracters are observed. The affected parts become yellow, opaque, and
ft, and give rise to the appearances formerly and by some authorities
en now regarded as characteristic of yellow tubercle. When tubercles
come caseous, small yellow nodules are seen, but these are frequently
mulated by a section of a bronchial division or or alveoli inclosing case-
s matter. There is no doubt but that complete liquefaction may take
ace finally, followed by absorption or expectoration of the morbid pro-
ict, and ultimate recovery. Frequently calcification ensues, hard cal-
reous nodules or masses remaining in the lungs. The further course of
thisis, however, is characterized ordinarily by the continued softening of
e morbid materials, which finally communicate with the bronchi, and
e discharged by expectoration, cavities, excavations, or vomicæ being
us originated in the lungs. These vary greatly in number, form, size,
d other characters. Often they are of wide extent, in consequence of
ntinued enlargement or the coalescence of cavities originally distinct, or
veral may communicate together in an anfractuose and irregular manner.
hey increase either by an infiltration of their walls, with subsequent casea-
on and disintegration, or by the secondary formation and destruction of
bercle. Their walls are irregular and soft at first, and they contain
nerally a muco-purulent or purulent-looking substance, or sometimes a
rty, thin, and fetid liquid. A variable number of bronchi are seen open-
g abruptly into a cavity, either directly or slantingly, and presenting cir-
lar or oval orifices. Obliterated branches of the pulmonary artery may
observed on the walls or passing across the space, but sometimes the
ssels are not closed, and they may be the seat of small aneurismal dila-
tions or "ectasias," thus greatly increasing the liability to fatal hæmor-
ge. Obliterated bronchi and thickened fibrous bands may also tra-

verse a cavity. Niemeyer was of opinion that most of the excavations seen in phthisical lungs are due to dilated bronchi, but it is impossible to agree with this statement. In most cases of phthisis more or less chronic interstitial pneumonia is set up, which often materially aids in arresting and repairing the mischief resulting from the disease. It arises in the neighborhood of consolidations and caseous products, sometimes forming dense capsules around them, or originating indurated masses; and also around cavities. The latter after a time tend to become smooth and apparently lined by a secreting membrane should the consumptive process cease; subsequently they may gradually contract and finally close up, leaving only an indurated puckered cicatrix. In some very chronic cases of phthisis the affected portions of the lungs may present nothing but fibroid induration, with cavities in various stages of contraction. It must be remembered that this last condition originates in a different manner from that which is believed to occur in primary fibroid phthisis. In addition to the diverse appearances in the lungs resulting from the combination of conditions already described, these are generally further modified by their association with bronchitis, often with ulceration of the bronchial mucous membrane, dilated bronchi, emphysematous patches, pulmonary collapse, extravasations of blood or their remains, or recent pneumonia. Pleuritic adhesions and thickenings are always evident, especially at the apices, where a dense fibrous cap is often formed, which may be half an inch or more in thickness. In these adhesions new vessels are developed by extension from the intercostals, and thus a communication is formed between the latter and the vessels of the lungs. Other structures besides the lungs are generally found to be involved in cases of death from phthisis, as will be pointed out when considering its complications.

Symptoms.—Chronic phthisis presents considerable variations in its clinical history, both as regards its mode of onset and its subsequent course, but the symptoms bear a general resemblance in the different cases. The disease may commence quite suddenly, as by an attack of hæmoptysis; or it may remain after some acute affection; or may come on acutely, afterwards becoming chronic; or may set in gradually and insidiously. In the later case the pulmonary symptoms are first observed in some instances, especially those indicative of chronic bronchial catarrh; in others, signs of constitutional disturbance or of derangement of the digestive organs are noticed at the outset. The symptoms may be described as local and general. *Local.*—Pains in the chest and sides are common, though not usually severe. They seem generally to be either pleuritic or muscular, the latter being often the result of cough. Dyspnœa is frequently present, more or less, from various causes, but may be entirely absent. • Respirations are usually increased in number, rising somewhat towards evening. Shortness of breath on exertion is very commonly complained of. Of course when the lungs are extensively diseased breathing is much affected. Cough is an essential symptom of phthisis, and may for some time be the only one complained of. In its severity and characters it differs widely, and that by no means necessarily according to the extent of the disease. At first it is often dry and hacking. An abnormal condition of the throat or larynx not infrequently gives rise to cough, which in the latter case is generally of hoarse quality. It is usually worse on first lying down at night, after sleep, and after meals. A paroxysm is often terminated by vomiting, especially after food has been taken. Expectoration soon occurs in most cases, but much of the sputa comes in many cases from bronchial tubes, which are the seat of the catarrh. Their characters and amount alter during the course of a case, and they present much variety in these respects. At first they consist merely of clear mucus, or sometimes small opaque pellets are discharged; subsequently they become muco-purulent;

and when cavities of some size form, irregular, opaque, airless masses are often expectorated, more or less greenish-yellow, which sink in water, and which when discharged on to a flat surface spread out in the form of a coin, hence named "nummulated." This kind of sputum is not characteristic of phthisical cavities, however, as it may be observed in mere bronchitis. The masses are mingled with more or less bronchial mucus. In some cases mere pus is expectorted, and occasionally a quantity of matter is suddenly discharged, owing to the opening of a cavity. The sputa often have an unpleasant odor, and they may be extremely offensive, but this is exceptional. In favorable cases, even after large cavities have formed, expectoration diminishes and may ultimately cease altogether. Examination of the sputa may reveal evident caseous or calcareous particles. Microscopic examination discloses epithelium, abundant newly-formed granular or pus-cells, blood-corpuscles, numerous fat-granules and oil-globules, calcareous granules, vegetable growths not uncommonly, and in some instances fragments of the lung tissues, especially elastic fibres, the presence of these last elements being regarded as of great importance. Sugar may often be detected chemically. Hæmoptysis demands special notice. This symptom is observed to a greater or less degree in the large majority of cases of phthisis, varying, however, considerably as regards the amount and exact characters of the blood discharged and the frequency of its occurrence. The amount of blood may range from mere streaks in he sputa to a quantity sufficient to prove immediately fatal, but death directly due to hæmoptysis is not a common event in phthisis. When blood is intimately mixed with muco-purulent matter, it has been stated to be pathognomonic of chronic catarrhal pneumonia. The hæmoptysis is frequently, but not necessarily, brought on by some exciting cause, such as a violent cough. In certain cases it tends to be repeated, and may become almost periodic. When not abundant the loss of blood seems to afford relief sometimes, but usually the effect of hæmoptysis, if in any quantity or if liable to frequent recurrence, is to induce debility and anæmia, or it may increase the local mischief in the lungs. It is believed by some authorities that the blood generally comes from the bronchial capillaries, but probably the pulmonary vessels are its usual source. These may be in a state of fatty degeneration; or, as already remarked, considerable branches may remain unobliterated or be the seat of ectasias, by their rupture giving rise to fatal hæmorrhage. *General.*—Pyrexia is a very important symptom in cases of phthisis, and one which should always be looked for by the systematic use of the thermometer. This instrument is particularly important in detecting an early stage of the disease, and in indicating its degree of activity. It has been also stated that the thermometer aids in determining the nature of the destructive process, tubercular phthisis being characterized by a more continuous fever than the other forms. This is a very questionable statement, however. As a rule marked daily variations in temperature are observed, and it increases considerably in the evenings. Towards the close of many cases of phthisis hectic fever in its most typical form is observed. Dr. Ringer, as the result of his observations upon the temperature in phthisis, has come to the following conclusions: 1. There is probably a daily unnatural elevation of temperature in all cases during the continuance of catarrhal pneumonia, or whilst a deposition of tubercle is taking place in any organs of the body. 2. This elevation of temparature is due either to the miliary tuberculosis or catarrhal pneumonia, and not to secondary complications. 3. It is probably due rather to the general than the local conditions existing in phthisis. 4. The temperature may be taken as a measure of the amount of tuberculosis or catarrhal pneumonia, and fluctuations in the temperature indicate corresponding fluctuations in the amount of disease. 5. The temperature is a more accurate indication of the activity of tuberculosis or catarrhal pneumonia than either the physical signs or the symptoms. 6. By means of the temperature we can often diagnose tuberculosis or catarrhal pneumonia long before we can detect any physical signs, and at a period when the symptoms are insufficient to justify such a diagnosis. 7 By means of the temperature we can diagnose tuberculosis, even when during the whole course of the disease there are no physical signs indicative of tubercular deposit in any of the organs of the body, and when the symptoms are inadequate to enable us to arrive at such a diagnosis. 8. It is probable that by means of the thermometer we can decide when the tuberculosis or catarrhal pneumonia has ceased, and that any existing physical signs are due to obsolescent tubercle or to the products of previous catarrhal pneumonia, and the chronic thickening of the lung-tissue around and between the deceased products. Observations have been made by Dr. Charteris and Dr. McAldowie with reference to the difference in the axillary temperatures on the two sides in cases of phthisis, and I have recently carried out some investigations on the same point. It is supposed that the temperature is higher on the side which is solely diseased, or which is most affected ; but although this is often observed, it is by no means always the case, and the results deduced from the investigation of a number of cases were so indefinite, that they do not warrant any conclusion which can be of service in the diagnosis of phthisis. Night-sweats are complained of in the large majority of cases of phthisis in some parts of their progress. These tend to come on especially towards early morning, but not infrequently they set in as soon as the patient falls asleep, and may be so excessive as to saturate the bedclothes, causing much distress and exhaustion. Sweating from slight exertion is also often noticed. This excessive perspiration is due either to fever or to weakness. Loss of flesh is another prominent symptom, being dependent chiefly upon the pyrexia. This must be determined by frequent weighing, and no reliance ought to be placed on the mere statement of the patient. The emaciation is often extreme, and it is a matter of common observation that it is more marked about the body and limbs, and especially the chest, than in the face. The fat disappears and the muscles feel flabby and wanting in tone. The chest muscles are sometimes very irritable on percussion More or less anæmia is frequently observed, and there may be œdema of the legs from this cause. At first the blood is generally hyperinotic, but soon it deteriorates in quality. In many advanced cases the skin is dry and scaly. Among other external appearances which may be noticed are chloasma over the chest, grayness of the hair in this region, lankiness and falling off of the hair generally, or bulbousness of the finger-ends, with incurved or cracked nails. The patient almost always complains of debility, varying in degree to the most absolute helplessness and exhaustion. The pulse is increased in frequency in most cases, and tends to be quick, sharp, small, and wanting in tone. The digestive organs are generally out of order. Loss of appetite, thirst, and dyspeptic symptoms are often complained of. Not uncommonly the mouth, tongue, and throat are red and irritable, this being accompanied with signs of subacute gastritis. The tongue is frequently more or less furred. In some instances the stomach is extremely irritable, retching and vomiting being immediately excited when anything is taken. The breath has in not a few cases of phthisis a very peculiar odor, which has appeared to me to be quite characteristic. At the close thrush is not infrequently observed. It has been stated that phthisical patients have a peculiar dislike to and difficulty in the digestion of fatty substances, but there are many exceptions to this statement. Constipation is the rule at first, but later on there is a great tendency to diarrhœa. A red line along the gums and transverse cracking of the teeth have been described as significant of phthisis, but they are frequently absent, and are not at all characteristic. Consumptive patients are inclined to be irritable and fretful. As a rule they are remarkably hopeful, and even when near the end cannot realize their condition, but imagine that that they will recover. The urine is more or less febrile in the early stage, and contains excess of the products of tissue destruction. Finally it becomes watery and deficient in solids. Albumen or sugar may be present. The menstrual functions are often imperfectly performed, or entirely in abeyance. *Physical Signs.*—The physical signs which may be associated with phthisis are due to: 1. Primary consolidation. 2. Softening of this consolidation. 3. Cavities in the lungs. 4. Secondary consolidation from interstitial pneumonia, which tends to produce much induration and shrinking of lung-tissue. 5. Other pulmonary affections, viz., pleurisy, bronchitis, emphysema, pneumonia, hæmorrhage into the bronchi, and pneumothorax, It has been customary to divide phthisis into three stages when describing the physical signs, namely, those of consolidation, softening, and excavation, but these are usually more or less combined, while in addition evidences of curative changes are frequently observed. The extent over which the morbid signs are perceived varies considerably, and in most cases they are present in different stages over different parts of the chest. An important character pertaining to chronic phthisis, however, is that they tend to be localized, the rule being that they are particularly observed over one or both apices, especially in front, though not to the same degree on the two sides. But this is not always the case, and therefore it is essential to examine every portion of the thorax if there is any suspicion of the existence of phthisis, and also to make frequent examinations in order to determine the progress of the disease. It is not intended here to describe the physical signs in different stages, but those characteristics of cavities will be pointed out separately. It must be remembered that they will be greatly influenced by the situation, nature, and amount of the consolidation. 1. As regards shape and size the thorax may be congenitally small, being either alar or flattened, but in a large proportion of cases it is originally in every respect well formed. At first there may be no local depression, or even some degree of bulging, but the tendency is for the chest to sink in some part, especially in the supra and infraclavicular regions; a considerable portion of one or both sides may ultimately fall in. There is often lowering of the shoulder when one apex is much involved. 2. Local movements are more or less deficient, especially that of expansion. 3. Vocal fremitus is usually increased, but may be normal or diminished. 4. Percussion reveals deficiency of resonance or a rise in pitch, which may culminate in the most absolute hard wooden dulness, with more or less resistance. Over the clavicles the sound is frequently purely osteal. The area of pulmonary sound is often diminished towards the neck, showing that the apex of the lung is contracted. The effect of holding the breath after a deep inspiration will sometimes show deficient resonance where previously it could not be detected. The percussion-sound may, however, be perfectly normal in phthisis, or even unusually clear and resonant at the outset. 5. Respiratory sounds may be weak to complete extinction, jerky or of "cogged-wheel" rhythm, harsh with prolonged expiration, or bronchial or blowing. In healthy parts they are often puerile. 6. The adventitious sounds which may be heard are those indicative of bronchial catarrh or pneumonia, collapse rhonchus in the neighborhood of the consolidation, or dry cracking followed by moist crackling or even somewhat bubbling rales, significant of softening. 7. Vocal and tussive resonance are usually exaggerated. 8. Localized pleuritic friction or cracking is frequently observed. 9. *The heart may be drawn up* considerably, as well as uncovered by lung, so *that the impulse is extensive* and strong, and the sounds are loud. The better conduction of the latter towards the right infraclavicular region than the left is not infrequently a very useful sign of disease at the apex of the right lung. Rarely the heart is lowered, or it may be displaced laterally. 10. A subclavian murmur is not uncommon, especially on the left side, due to pressure by thickened pleura on the subclavian artery. 11. The diaphragm and liver or stomach are sometimes drawn up, owing to contraction of either lung. *Signs of Cavities.*—These vary considerably according to size, shape, number, and situation of the cavities, as well as with the state of their walls, their contents, the condition of the surrounding tissue, and other circumstances. It can readily be understood that vomicæ may exist without there being any, or only doubtful evidences of their presence; and, on the other hand, a careless observer might mistake signs which simulate those associated with cavities; but cavities in the lungs may generally be detected when they have formed, and by careful attention to, and adequate study of, the physical signs present, a tolerable accurate conclusion may be arrived at as to their exact conditions, while by examination from time to time the progressive changes may be noted, excavations being thus often traced to their formation, enlargement, contraction, and final closure. The following are the important signs of cavities: 1. Percussion sound may be tubular, metallic, crack-pot, or very rarely amphoric. A rise in pitch on opening the mouth has been considered a characteristic sign of a cavity. 2. Breath sounds are either blowing, or more or less hollow, ranging from tubular to cavernous or amphoric. Inspiration has a pecular sucking or hissing character sometimes. 3. The chief significant adventitious sounds are large moist rales at the apices, where there are no bronchi of any size; or hollow, metallic, or ringing rhonchi, varying in size, amount, and quality, being sometimes gurgling; and very rarely metallic tinkling or amphoric echo. 4. Vocal resonance may have a ringing or metallic character, and is often greatly intensified. Pectoriloquy and whispering pectoriloquy are not uncommonly observed. 5. Tussive resonance is often painfully strong and metallic, but cough is chiefly useful in that it may cause the breath-sounds to be better heard, by clearing away secretion or emptying a cavity, or that characteristic adventitious sounds are brought out during the act. 6. The heart-sounds are sometimes much intensified by transmission through cavities, and may acquire a peculiar hollow quality, or be attended with an echo. The cardiac action occasionally elicits rhonchi in neighboring cavities. 7. It is said that a murmur may be heard in rare instances over a vomica, due to an aneurismal dilatation involving a branch of the pulmonary artery. *Complications.*—Numerous symptoms and physical signs which occur in the course of pulmonary phthisis are dependent upon the complications so often met with, some of which are due to tubercle in other parts. The chief of these inlcude: Affections of the larynx and trachea, especially ulceration; bronchitis; pneumonia, or pleurisy; peforation of the pleura, with consequent pneumothorax; enlargement of the external absorbent glands, or of those in the chest and abdomen; tubercular peritonitis; ulceration of the intestines, especially the ilium, fatty or amyloid liver; fistula in ano; various forms of Bright's disease; diabetes; pyelitis; tubuercular meningitis or tubercle in the brain; and thrombosis of the veins of the leg. *Course—Duration—Terminations.*—The course and duration of chronic cases of phthisis are subject to much variety. The disease may progress steadily from bad to worse, either rapidly or gradually, but more commonly there are intervals of improvement, followed by exacerbations. Some cases remain apparently in the same state for a long time; while others, even when far advanced, improve and may ultimately become practically cured. It is sometimes quite astonishing what a length of time patients will remain alive, when apparently almost in a moribund condition. Death may take place from gradual asthenia and hectic fever, from hæmoptysis occasionally; from some of the complications mentioned above, which generally aid in bringing about the fatal result, or from some intercurrent attack. *Varieties.* —It is very difficult, in the present undecided state of opinion and knowledge, to determine upon the adoption of any definite division of cases of pulmonary phthisis into varieties which shall be of practical value from a clinical point of view. As has been already intimated, some eminent authorities refuse to recognize any varieties of this disease, and will only acknowledge the division of cases into acute and chronic according to the intensity and duration of the symptoms. Others adopt a pathological classification, but certainly no corresponding clinical arrangement is practicable. Withont attempting any discussion on this matter, it may be well to give a summary of the chief varieties of consumption which have been brought forward by different writers, and to point out the supposed clinical distinctions between certain of them, but the following arrangement can only be regarded as a provisional one: I. *Acute.* 1. Croupous pneumonic. 2. Catarrhal pneumonic. 3. Miliary or tubercular. II. *Chronic.*—1 Pneumonic. 2. Catarrhal pheumonic. This tends to come on insidiously, being proceeded by one severe and long-continued attack of bronchial catarrh, or by several repeated attacks. The thermometer reveals more or less pyrexia. The disease is prone to be localized, and slow in its progress, while under proper treatment it shows a decided tendency towards cure, with contraction and induration of the affected part. 3. Pleuritic. Unquestionably phthisis may originate from simple pleurisy, especially by leading to compression and subsequent destruction of the lung, and I think that this form of the disease deserves a special designation. 4. Hæmorrhagic. Two distinct meanings have been given to this term. With some writers it merely implies that the disease has commenced with spitting of blood, or that this is a prominent and frequent symptom in its course; with others that the hæmorrhage into the bronchi or lung-tissue has actually set up phthisis by exciting inflammation. The phthisis may originate in this manner seems to me absolutely certain. Dr. Reginald Thompson* has made some important pathological observations bearing upon this subject, and has arrived at the following conclusions: *a.* That in cases of severe hæmoptysis portions of the blood are driven into the alveoli which they occupy finally in the form of fibrinous nodules, setting up some irritation in their vicinity. *b.* That in cases of capillary hæmorrhage with laceration of the pulmonary tissue, the resultant effect produces a calcareous mass, sometimes of considerable size. *c.* That under special circumstances cavities may be formed by the liquefaction of the hæmorrhagic nodules in the first instance, or by the removal of the calcareous masses in the second. *d.* That whether secondary tubercle can result from inhaled blood without the intervention of secondary processes introducing a new septic condition, is a point that requires further evidence before it can be accepted. 5. Fibroid. This variety has already been fully considered. 6. Mechanical. Produced as the result of the constant inhalation of irritant particles, this form has several subdivisions, named according to the nature of the occupation or of the irritation *e. g.*, miners', colliers', and knife-grinders' phthisis, carbonaceous, phthisis, cotton phthisis, etc. The progress is slow, the morbid process being due to a combination of chronic bronchitis, with catarrhal and interstitial pneumonia, though at last true tubercle may form. The expectoration contains more or less of the inhaled substances, sometimes in great abundance Thus in carbonaceous phthisis of anthrakosis the sputa may be perfectly black, and the lungs are often observed on post-mortem examinations to be in the same condition. 7. Secondary tubercular, *i. e.*, where tubercle is added to some previous morbid condition. Niemeyer has given the following signs as suggestive of the secondary development of tubercle, but justly remarks that the diagnosis is a matter of much difficulty; great increase in dyspnœa and frequency of respiration, without any corresponding increase in physical signs, the fever becoming of a more continued type, and symptoms indicative of laryngeal complication, of intestinal ulceration, or of tubercle in other parts, setting in. 8. Primary tubercular. Here there is no preceding bronchial catarrh. The patient may be evidently tuberculous, while the constitution is greatly affected from the outset, pyrexia of continued type and wasting being marked symptoms. Dyspnœa is often severe, with rapid breathing, but there are no adequate physical signs. Afterwards there may be evidences of inflammatory consolidation and destruction of tissues but not to the same extent as in other forms. Soon indications of laryngeal phthisis, ulceration of the bowels, tubercular peritonitis or meningitis, or of other complications appear. The progress is generally rapid. Some writers recognize scrofulous phthisis, drunkards' phthisis, and other special varieties. Among the cases which have come under my own observation none have occurred indicating any such distinct forms of the disease. *Diagnosis.*—The diagnosis of phthisis involves not only the recognition of the presence of the disease, but also as correct a knowledge as can be obtained of its seat and extent, its stages in different parts of the lungs, and its nature and origin. These questions can only be determined by a careful consideration in each case of the history, as well as of the existing symptoms both local and general, and by thorough and systematic physical examination. The diagnosis of phthisis will be considered more fully later on. *Prognosis*—Those who desire full information on this important subject will find it in the valuable work of Dr. James Pollock on consumption. The ability to form a reliable prognosis in phthisis, can however, only be acquired by much experience and observation. There is now ample evidence to prove that phthisis may in many cases undergo a complete cure, while in a large proportion its progress may be greatly delayed by appropriate treatment, and life rendered fairly comfortable. It is difficult and does not serve any useful purpose to lay down any average duration or mortality, these varying so much under different conditions. In endeavoring to arrive at a prognosis the chief circumstances to be taken into account are as follows: 1. The stage, seat, and extent of the disease. At an early period a hopeful opinion is warranted as a rule, though at the same time it should be a guarded one. When cavities have formed the prognosis is very much worse. If the disease is limited to one apex, even should there be a cavity, recovery is not unusual; but the prognosis is more serious in proportion to the extent of the mischief and the number of excavations, especially if both lungs are involved. Basic phthisis seems to be unfavorable. 2. The progress of the local lesions. Signs of rapid progress, either as regards the extension of the disease or a tendency to softening and destruction of tissues, are very unfavorable; on the other hand, if the disease is chronic or at a standstill, or if, should a cavity have formed, there are indications that it is drying up and contracting, the prognosis is much more hopeful. Signs of considerable local consolidation and induration from interstitial pneumonia are often favorable, as showing cessation of active disease, and the advance of healing processes. 3. Origin and nature of the disease. · Tubercular phthisis is extremely serious; when the complaint follows bronchial catarrh or is due to certain obvious external causes, from the influence of which the patient can be removed, there is a far better chance of recovery. 4. Constitutional condition and hereditary predisposition. Phthisis is more dangerous if the patient is feeble and delicate, but especially if there are evidences of the existence of a tubercular or scrofulous diathesis, or if there is a strong hereditary tendency to phthisis. 5. Local symptoms. Continued dyspnœa, harassing cough, profuse expectoration, and severe or repeated hæmoptysis are bad indications. 6. General symptoms. Phthisis is dangerous in proportion to the degree and prolonged course of pyrexia, rapidity and weakness of pulse, debility and incapacity for exercise, emaciation, and nightsweats. If the general condition shows signs of improvement, the pyrexia ceasing, and flesh and weight being gained, the prospect is much more hopeful. 7. State of the digestive organs. Inability to take food or to digest it is a most serious drawback in phthisis. Cases in which vomiting is a prominent symptom are also exceedingly unfavorable. 8. Diet and hygienic conditions. Deficient or non-nutritious food and improper hygienic conditions are most injurious in cases of phthisis. This is frequently exemplified among the out-patients at the Bromptom Hospital. Many who become in-patients revive wonderfully as the result of the improvement in their diet and surrounding circumstances. 9. Complications. Several of these morbid conditions seriously increase the gravity of the prognosis in phthisis, and hasten the fatal result, such as intestinal ulceration, laryngeal phthisis, or Bright's disease; and some complication, for instance, pneumothorax or intestinal perforation, may be the immediate cause of death. The question is often asked in advanced cases of phthisis, How long is the patient likely to last? It is useless to attempt to give more than an approximate opinion on this point, there being so much uncertainty. The appearance of thrush is generally a sign of the "approach of the end." Another question refers to the effects of pregnancy. Usually this condition seems to delay the disease for a time, so far as I have observed; but after parturition it generally advances with increased rapidity. Marriage of persons decidedly phthisical should certainly be opposed. *Treatment.*—The ultimate objects to be kept in view in the treatment of phthisis are: First, its prevention and arrest; secondly, its cure; or, failing these, thirdly, palliation of symptoms and prolongation of life. Every case requires thoughtful consideration, and it must not be imagined that this is a disease capable of being controlled by any one remedy or class of remedies. An essential part of the treatment, however, is that which has for its end the maintenance and promotion of a state of general good health and constitutional vigor. 1. *General Hygienic and Dietetic Treatment.*—This is of the utmost importance, both for the prevention and cure of phthisis, and if it is neglected all other measures are usually unavailing. The chief things required under this head are a healthy residence, on a dry soil, in a suitable climate, elevated but well protected from cold winds, with pleasant scenery and sufficient vegetation; free ventilation, especially as regards the sleeping apartments; fresh air and exercise, so far as the powers of the system will permit; the avoidance of crowded places at night, and of all causes which are likely to excite pulmonary affections; the wearing of warm clothing, with flannel next the skin; the employment of cold baths, if they can be borne, with friction afterwards; the administration of as nutritious a diet as can be assimilated, which should contain a good proportion of fatty elements; and the avoidance of all injurious habits, such as intemperance, excessive smoking, or sexual excess. The question of climate will be separately considered. It is often requisite to inquire into the occupation of the patient, and to change this, should it entail either prolonged confinement in a close room with deficient exercise, or exposure to the exciting causes of lung diseases. At the same time the patient should, if possible, be relieved from undue mental labor or anxiety. The amount and character of the exercise to be adopted must vary in different cases, but as a rule such exercises as aid in the expansion of the chest are to be recommended, especially in young patients, though they must be kept within proper limits. Walking and riding are useful, and, if these cannot be endured, passive exercise is to be enjoined, the patient being driven out daily when the weather permits, so that at least a proper supply of fresh air may be obtained. At the same time overfatigue must be avoided. Certain acts which call into exercise the muscles of respiration are often beneficial if duly regulated, such as taking deep inspirations, reading aloud, or moderate singing. Anything that interferes with the freedom of the respiratory movements, as the pressure of tight stays or a bent position, ought to be forbidden. Milk is a most valuable article of diet, and some practitioners consider asses' or goats' milk especially efficacious. Whey has also been well spoken of. In many cases a little wine or beer is very beneficial. 2. *Preventive Measures.*—In all cases where there is any fear of phthisis setting in, attention should be paid to the slightest indication of pulmonary disorder. Should the complaint be acute in its origin, and of an inflammatory nature, the measures already mentioned when treating of the different forms of pulmonary inflammation must be had recourse to. Further, any acute exacerbation should receive immediate attention ; but at the same time it is very important in most cases to avoid lowering measures, and to preserve the strength as much as possible, rest in bed being enjoined. Of course everything which is likely to excite irritation in connection with the lungs must be strictly guarded against. 3. Before proceeding to the active treatment of any case of phthisis, it is of the greatest consequence to look to the state of the digestive organs. Unless digestion is carried on properly, all other means are of little or no avail ; and here it must be mentioned that regularity of meals and other matters upon which healthy digestion depends should receive due consideration. If any form of dyspepsia is present, the appropriate remedies must be administered. Should there be signs of gastric irritation, a combination of bismuth with an alkaline carbonate and hydrocyanic acid frequently proves very beneficial. In the early period the bowels are often confined, and some mild aperient must then be given, so that they may be opened daily. 4. *General Medicinal Treatment.*—Various tonic and other medicines which improve the condition of the general health and the quality of the blood are very serviceable in phthisis. Of these the principal are the dilute mineral acids—nitric, hydrochloric, sulphuric, or phosphoric ; quinine ; different preparations of iron, especially if the patient is anæmic ; salicin, strychnia, and vegetable bitter effusions or tinctures, such as those of gentian, calumba, chiretta, quassia, or cascarilla. These may be given in various combinations. *Special Medicines.*—Among the many special therapeutic agents recommended for phthisis, cod-liver oil holds the first position. Almost universal experience has testified to its good effects in this disease. It is needless to enter here into the question of its mode of action, but certain matters of practical importance as regards its administration must be mentioned. Only a small dose should be given at first, not too often repeated. A teaspoonful once or twice a day is sufficient to commence with, the dose being increased by degrees to a tablespoonful three times daily. It is seldom desirable to exceed this quantity. Most patients take the oil best immediately or soon after meals, and if it tends to disagree, lying down for a short time after taking it will not unfrequently prevent any ill effects. Some can manage it best when going to bed at night. It is always well to make use of some vehicle for administering the oil, even when it can be taken alone, but the quantity of this should not be large. It may in many cases be given with the mixture ordinarily taken, if this is of a bitter or acid nature, or with steel wine or syrup of the phosphate of iron. Milk, orange wine, frothy stout or ale, or a little cold brandy and water, are among the most useful vehicles. When the oil repeats or causes sickness, it is often well borne when given with lime-water or milk in equal parts, some of which may also be drunk after it. For children it may be made into an emulsion or mixture according to the following formula, which is employed at the Brompton Hospital :

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* *Medico-Chirurgical* Transactions, vol, lxi. page 253.

℞	Ol. morrhuæ	ʒ vj.
	Liq. potassæ	m xl.
	Liq. ammon. fort	m ij.
	Ol. cassiæ	m j.
	Syrupi	ʒ ij

M. Dose : Two teaspoonfuls.

Small doses of strychnine have been found very useful in preventing the nauseating effects of the oil. It is most important to look to its quality, especially at the outset, otherwise a patient may acquire an insurmountable antipathy to it. Different varieties are preferred by different practitioners. A good pale oil seems to answer best generally ; many patients like De Jongh's pale-brown oil very well. Regularity and perseverance in the use of the remedy are essential in order to realize the effects which it is capable of producing. During its administration the diet must be carefully attended to, and should not be of too rich a character. If from time to time the oil appears to disagree with the digestive organs, it may be temporarily omitted, especially during the warmer months. It has been recommended to introduce cod-liver oil by inunction or enema, but, though necessary under some circumstances, these modes of administration are objectionable as a rule. Inunction is often advantageously employed in the treatment of children. Several preparations containing cod-liver oil have been made, such as the etherized oil, which is a valuable compound, or a combination with quinine, hypophosphite of lime, extract of malt, and other medicines. Numerous substances have been advocated as substitutes for cod-liver oil, but they are far less efficacious. The chief of these are olive oil, skate, shark or dugong oils, cocoanut oil, dog's fat, glycerin, and cream. The last two certainly produce good effects in some cases. Chaulmoogra oil has also been receatly recommended in phthisis. Space will only permit the enumeration of some other special agents recommended in the treatment of phthisis. The principal are pancreatic emulsion ; hypophosphites of lime, soda, and iron ; phosphate of lime ; extract of malt ; iodide of potassium ; iodide of iron ; sulphurous acid and sulphites ; arsenic and koumiss. These have been very differently reported upon by different observers, and though most of them are useful in certain cases, they are in no sense to be looked upon as specific remedies. 6. *Local Treatment.*—Applications to the chest are decidedly useful in many cases of phthisis, either for the relief of symptoms, or for the subdual of inflammatory processes ; or possibly they may have an immediate effect on some forms of the disease. The most useful are sinapisms ; small or flying blisters ; applications of iodine, more or less powerful ; and liniments of croton oil, turpentine, or acetic acid. Local removal of blood is decidedly but seldom desirable. In acute exacerbations fomentations and poultices are often required. In some cases the application of strapping over parts of the chest, in order to procure mechanical rest, has a beneficial effect as regards the progress of phthisis. 7. *Symptoms and Complications.*—Various symptoms frequently need attention during the course of a case of phthisis, but it is impossible to do more here than point out their nature, and suggest the indications for their management, most of them being considered in detail in other parts of this book. Pyrexia must be subdued, especially if it is inclined to be high. Quinine in full doses combined with digitalis may be given for this purpose. Sponging the skin or the employment of cold baths are beneficial in some cases. Debility and wasting will be counteracted by the general treatment already indicated, as well as by subduing the fever. When there is much exhaustion, considerable quantities of alcoholic and other stimulants are required. For night-sweats the chief remedies are oxide of zinc, gr. ij–v, in the form of pill or powder, given at night, which may be combined with extract of belladonna or morphia; tincture of belladonna, or subcutaneous injection of atropia; or a full dose of quinine or gallic acid. Subcutaneous injection of ergotin has also been advocated. In some cases I have found that the night-sweats were best checked by the administration for a few days of a mixture containing quinine, alum, and dilute sulphuric acid. Sponging the upper part of the body carefully with vinegar and water is sometimes useful. Pains about the chest are often relieved by the local applications already mentioned, or by wearing some anodyne or warm plaster; in a considerable number of cases much pain in the side is complained of from time to time, either muscular or pleuritic, and this is almost invariably at once relieved by strapping the side properly as described under pleurisy, which is the plan of treatment I usually adopt under such circumstances. Cough is often a most troublesome symptom in phthisis. It is by no means always desirable to stop it, but its management must be guided by the amount of expectoration, the discharge of which is to be encouraged, or its amount diminished by means of remedies mentioned under bronchitis. In most cases cough needs to be relieved, and it is always advisable first to look to the state of the throat and larynx, as cough is very commonly due to some unhealthy condition of these parts. Local applications of tannin or chlorate of potash, or various astringent gargles or lozenges, are often most beneficial. If the cough is irritable, anodynes are valuable, especially opium, morphia, codeia, hydrate of chloral, croton chloral, bromide of ammonium, conium, belladonna, or chlorodyne, some of which may be combined. These are best given in the form of lozenges, syrups, or tinctures, and it is desirable to make all cough mixtures as small as possible. Tincture of gelseminum has been recommended for the relief of cough in phthisis. Anodyne and other inhalations are in many cases extremely serviceable, but not on account of any curative influence upon the disease. They are particularly useful if the larynx is affected. If the expectoration is fetid, disinfectant inhalations should be employed. Weak iodine inhalations are sometimes decidedly beneficial. Dyspnœa and hæmoptysis must be treated according to the ordinary principles. Vomiting is sometimes a very distressing symptom; if the ordinary remedies fail, small doses of strychnia should be tried, and its effects are in some cases most satisfactory. Diarrhœa, if due to ulceration of the bowels, is frequently very difficult to check. Carbonate of bismuth, gr. v–x, with Dover's powder, gr. iij–v, is often a useful combination, but enemata of starch and opium are most to be relied upon in obstinate cases. Other complications must be attended to as they arise. 8. *Change of Climate and Sea Voyages.*—This is a most important subject in connection with the treatment of phthisis, and for detailed information the reader is referred to the writings of Williams, Walshe, Henry Bennet, Madden, and others. In selecting a suitable climate, the chief points to be observed are that it is not liable to either extreme of temperature, that the air is pure and not too moist, that the soil is healthy, and that there is no likelihood of sudden changes, of exposure to cold winds, or of continued unfavorable weather. It is always well also to choose a place rendered attractive by bright sunshine, pretty scenery, and pleasant company. One most important object to be kept in mind in selecting a climate is, that the patient may be enabled to be out in the open air as much as possible The salutary influence of high altitudes upon phthisis has been established, and some authorities recommend a residence in mountainous districts even during the winter. It is questionable, however, whether this is desirable; but patients should rather reside in some warm and sheltered place during the colder months, and go to a high and dry region during the warm season. The exact qual-ties of the climate which are suitable for any individual case will depend upon its mode of origin, upon the conditions of the bronchial mucous membrane, and other circumstances. Those cases which are of constitutional origin are particularly benefited by a sojourn in lofty regions. The principal seaside places suitable for phthisical invalids are the Isle of Wight, especially Ventnor and Undercliff, Bournemouth, Torquay, Hastings, St. Leonards, Eastbourne, Penzance, Worthing, Sidmouth, Cromer, Southport, Grange, Clevedon, Tenby, and Queenstown in this country, where the temperature is moderate, but moisture considerable; Mentone, Nice, San Remo, Palermo, Cannes, Malaga, Malta, or Algiers, where there is a high temperature, with but little moisture; Madeira, West Indies, and the Azores, where both temperature and moisture are considerable. Among inland regions, Pau, Pisa, Upper Egypt, Syria, Australia, and certain parts of South Africa are recommended; or if elevated districts are desired, the Alps, Andes, Himalayas, or the Mexican mountain ranges afford the requisite conditions. Among the places which have recently come into note, Davos in North Engardine, Switzerland, and Luxor, in Egypt, deserve special notice. Corsica and Sicily are also favorably spoken of as winter resorts. Long voyages, especially to Australia, or up the Mediterranean, are most useful in many cases, but they should not be recommended if the disease is too far advanced. A large number of patients are unable to avail themselves of the benefits to be derived from a suitable climate, though, thanks to the various hospitals established in many seaside places in this country, these advantages are more widely disseminated at present than they were formerly. If, during the winter months, patients are prevented by circumstances from residing in a proper climate, they should keep indoors as much as possible in bad weather and at night, avoid every cause of cold, and wear a respirator. Men should allow their beard and mustache to grow. 9. Special treatment of pulmonary consumption by mineral waters, compressed air, inhalation of oxygen, electricity, and various other methods, does not seem to have been attended with much success, as might be anticipated.—FREDERICK T. ROBERTS.

PINGUECULA—*See Conjunctiva, Diseases of.*

PITYRIASIS.—*Definition.*—Pityriasis is a chronic squamous disease of the skin, in which the scales are branny and are seated on a non-infiltrated surface.

Symptoms.—The eruption consists of the production of a quantity of fine scales, which are continually being shed and reproduced. The skin of the affected part may be slightly red, but there is no effusion into or thickening of the epidermic layer. There is but slight itching of the part, and, unless the skin be delicate, excoriations rarely result from scratching. Any portion of the body may be affected with pityriasis, but the most common sites are the hairy parts, more particularly the scalp. The ordinary condition, known as pityriasis capitis, has been shown by Hebra to be due to an increased secretion of the sebaceous glands, and is in no sense of the word a pityriasis.

Diagnosis.—Pityriasis may be confounded with:

1. Psoriasis.
2. Tinea tonsurans. The only certain mode of diagnosis is by the use of the microscope, which shows the characteristic fungous elements in tinea; in addition, to the naked eye the hair is seen to be broken off short, and is easily extracted.

Prognosis.—Pityriasis is a chronic and often intractable disease, but is never attended with any serious result.

Treatment.—It is usually treated locally by the application of alkaline lotions. The best are carbonate of potash, ʒ j to the half pint; or liquor potassæ, ʒ ij to ℥ viij of water. Ointments containing either a little sulphur or mercury, or both combined, are useful. In very protracted cases arsenic may be tried.—Malcolm Morris.

PITYRIASIS RUBRA.—*Definition.*—Pityriasis rubra is a chronic scaly disease, characterized by an intense reddening of the skin, which soon extends over the whole body, but which is not accompanied by any infiltration or thickening.

Symptoms.—Pityriasis rubra is a somewhat rare disease. Its chief characteristic is an intense reddening of the skin, which gradually extends over the whole surface, but fades on pressure. There is no infiltration or thickening of the reddened area, but the affected part is covered with loose scales of epidermis, which are shed in enormous quantities, often in large flakes, and the nails become opaque and irregular.

The reddening is much increased by heat, while cold, on the other hand, gives it a blue tint. At a late stage of the disease the color becomes lighter and of a yellow or brown hue, which fades after death, when the skin resumes its normal appearance. At no time is the itching at all severe, and constitutional symptoms are for a long time absent; but in the later stages of the disease the skin becomes extremely tender, the appetite becomes impaired, and the body emaciated, until death results.

The above description applies to the disease first separated from other affections by Hebra. It is right to mention, however, that several modern observers are of the opinion that it is merely an abnormal form of eczema, in which there is little or no exudation. Hutchinson believes that the essential features of the disease are "its occurrence in healthy persons, its proneness to become universal, and its non-amenability to treatment." "If, then, a person in good health should, without obvious cause, become the subject of a skin disease which should spread rapidly and very widely, involving the whole surface, and this eruption should prove to be uninfluenced by treatment, I would not care much whether the skin was dry or moist, whether it began as vesicles, papules, or erythematous patches, whether it were pruriginous or not. Such a malady would be probably, so far as causes are concerned, a close ally of pityriasis rubra" ("Clinical Lectures," 1879). The hard and fast lines drawn by Hebra, which would exclude from the category of pityriasis rubra all cases which do not conform exactly to the above description, cannot be sustained in practice, because cases differing somewhat from the typical form of pityriasis rubra, both in the character and the severity of the eruption and in the nature of their course, are not unfrequently met with.

Diagnosis.—From psoriasis and lichen ruber it may be at once separated by the absence of any infiltration, while the intense reddening of the surface enables it to be distinguished from pityriasis simplex or ichthyosis. The absence of moisture marks a difference from all varieties of eczema, and, further, the large extent of surface involved, the tenderness of the skin, and the absence of the characteristic papules definitely separate it from eczema squamosum, which is, moreover, essentially a local affection, while pityriasis rapidly becomes general.

Lupus erythematosus is said by Hebra to resemble pityriasis rubra both in the reddening of the skin and the production of epithelial scales, but the former is limited to the face, and is attended with "enlargement of the mouths of the hair sacs and sebaceous glands, which are also plugged with masses of hardened sebum."

Prognosis.—The prognosis in this disease is very unfavorable, and the majority of cases terminate fatally.

Treatment.—No treatmant has been found of any material use in checking the course of this disease, but the employment of tepid baths and the application of oil and emollient ointment is recommended by Hebra.—MALCOLM MORRIS.

PITYRIASIS VERSICOLOR—*See Tinea Versicolor.*

PLACENTA PRÆVIA, and its Prophylactic Treatment.—Ever since the days of Paul Portal, who lived in the latter half of the seventeenth century, that form of inevitable hæmorrhage which attends upon the implantation of the placenta over or near to the os internum uteri, and which at the end of gestation proves so fatal to both mother and child, has attracted special attention. Before his time many had noticed the fact that in numerous cases in which serious ante-partum hæmorrhage existed, the placenta was distinctly to be felt at the os internum and often at the os externum; but all had taken it for granted that this organ had originally been implanted near the fundus, and becoming detached from this point, had fallen down to the cervical region.

But even long after this time the fact once fully demonstrated was lost sight of, and the great obstetric lights of the eighteenth century—Daventer, Giffard, Roederer, Smellie and Levret—had, through ignorance of Portal's labors, to grope their way to the truth. Very near to it did Daventer come when he noticed the firm adhesion of the placenta to the wall of the cervical surface against which he found it, so that one might take it for an outgrowth from the part. But he regarded this adhesion as due to the cohesive power exerted by coagulated blood, and did not recognize the great essential pathological fact upon which all the therapeutic resources, applied under these circumstances, should rest for their efficiency. The others mentioned re-discovered Portal's discovery.

Portal recorded eight cases of placenta prævia. In seven of these he practiced version; and in one the child's head burst its way through the obstructing mass. In one case, having introduced his hand into the vagina, he describes what he discovered in these words: He "found the after-burden placed just before and quite across the whole inner orifice, which had actually been the occasion of the flux of blood; for, by the opening of the orifice, the said after-burden, then being loosed from that part where it adhered to before, and the vessels containing the blood torn and open, produced this flooding, which sometimes is so excessive as proves fatal to the woman unless it be speedily prevented." To Portal, then, we are indebted for the great pivotal fact around which have clustered, at a later period, the excellent results obtained by the labors of Giffard, Levret, Smellie, Roederer, Leroux, and Rigby; and, more recently still, those of Simpson, Barnes, and Greenhalgh.

Since the true pathology of these cases has been fully comprehended, obstetricians in succeeding ages have never ceased in their efforts at establishing a plan of managing them which would combat the great dangers attending them for mother and child. Fortunately we can now positively assert that the statement made by Dr. Renton,* just forty years ago, that "Portal, in 1672, knew as much on the subject of uterine hæmorrhage occasioned by the displacement of the placenta from the os uteri, and the practice necessary for its suppression, as we do at the present time," is incorrect. Since that period the tampon (introduced by Leroux one hundred years ago), vaginal and cervical water-bags, rupture of the membranes, and complete and partial separation of the placenta, have all been added to our means of controlling this dangerous complication of parturition.

Even now, however, we have by no means arrived at a point at which we can rest from our labors with a feeling that we have at our disposal means by which, under these circumstances, the danger of death can be *with any degree of* certainty warded off from either mother or child.

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* *Edinburgh Medica* and Surgical Journal, July, 1837.

Danger—manifest, inevitable, and treacherous in its approach—attends upon every case of placenta prævia. That it is susceptible of great diminution by skillful management, is an admitted fact; but in many cases it presents itself when the services of the practitioner are not attainable, and a fatal loss of blood may occur before they become so. No skill, no watchfulness, no caution, can, in the great majority of cases in private practice, prevent the possibility of a sudden separation of a portion of placenta, and a consequent sudden flow, when the patient is unable, for one or even for several hours, to obtain medical attention. During this time of anxious and hazardous waiting two lives may be lost, those in attendance being utterly powerless to aid the bleeding woman and perhaps smothering child.

Labor once being established, the means at our disposal for controlling hæmorrhage, with its double danger, may all be classed under two heads: first, those effecting control of the flow while the os dilates, those, in other words, which enable us to await the progress of labor without serious risk to life; and second, those which, disregarding the flow of blood, are addressed to a delivery of the child, so rapid that it may be accomplished before this flow can effect a fatal result. The cervix uteri represents a strait through which the child must, sooner or later, necessarily pass; and this strait has, in the attached placenta, an element of great danger which will be made active by such passage. The child, in its passage of this point, may be likened to a man who needs must pass a narrow portion of a defile where an inevitable, unavoidable danger awaits him. With this he may deal in two ways, which differ entirely from each other: first, he may resort to measures for suppressing the danger which he cannot remove, while he passes onward at his leisure; second, he may use no means for such suppression, but, trusting to a bold dash, he may rely for safety upon the rapidity of a determined advance and rush past the point of danger.

To state the matter, in reference to placenta prævia, in other words: first, we may alter the state of affairs at the cervix, so that dilatation may occur without hæmorrhage; second, we may hasten the delivery of the child, and render a gradual dilatation of the cervix unnecessary by rapid and immediate removal.

The means at our command for accomplishing these indications may thus be tabulated and presented at a glance:

Means for controlling hæmorrhage while the os dilates.	1. Distention of cervix by water-bags. 2. Evacuation of liquor amnii. 3. Partial detachment of placenta. 4. Complete detachment of placenta. 5. The tampon or colpeurynter.
Means for hastening delivery of child.	1. Ergot. 2. Version. 3. Forceps. 4. Craniotomy.

The means at our disposal for fulfilling both these indications are very efficient, and yet they leave a vast deal to be desired. They leave an hiatus which never can be filled, for the reason that great danger attends sudden losses of blood occurring at uncertain periods for two or three months before labor sets in. Even admitting that the means just mentioned are almost perfect, until some method of control can be established for those almost inevitable and often dangerous ante-partum flows of blood, the element of danger attendant upon this period of utero-gestation cannot be removed. And of what means can the most sanguine ever hope to avail himself to control the separation of placenta from uterus, at this time and under these circumstances?

Something more is surely wanting than means for conducting to a favorable issue a labor, complicated by placenta prævia, which has once begun. Some safeguard is required against the dangers of the three last months, which develop themselves unexpectedly, when no medical aid is at hand, and work their results so rapidly that it usually can not be obtained until great mischief has been done.

Let us pause here for a brief examination of the statistics of placenta prævia, as regards mothers and children. It is a well known fact that such statistics are very unreliable, and special doubts have been recently cast upon those relating to this subject. Why the statistics relating to placenta prævia should be less reliable than others, it is difficult to conceive. At least this much we may safely deduce from them, an approximate idea of the degree of danger attending the condition. So serious are its results that, although it occurs not oftener than once in five or six hundred cases, which is the proportion computed as correct by some authors, it exerts a marked influence upon the statistics of obstetrics. According to the calculation of Sir James Simpson, based upon the analysis of three hundred and ninety-nine cases, one third of the mothers and over one-half of the children are supposed to have been lost; and Read, in his admirable essay, computes the mortality as one in four and half mothers, while a large majority of the children are lost.

Surely these statistics offer us no reason for relaxation of effort, no grounds for satisfaction with what has been attained by the successors of Portal, no inducement for believing that our present resources are equal to the demands made upon them by this dangerous complication of parturition. And why are these inherent dangers of placenta prævia so active and so prolific in fatal consequences? Let me reply to the question by three formulated statements:

First. The dilatation of the cervix for the passage of the child, unavoidably exposes both mother and infant to great danger from placental detachment and hæmorrhage.

Second. Repeated hæmorrhages occurring during the three last months of pregnancy; the woman at the time of labor is unusually exsanguinated, exhausted, and depressed both physically and mentally.

Third. Profuse flooding generally occurring with the commencement of labor; the medical attendant is often not at hand, and reaches his patient only after a serious, perhaps a fatal, loss of blood has occurred.

There is but one method at present at the disposal of the obstetrician by which the evils attendant upon the three last months of utero-gestation, and upon labor thus complicated, can be avoided. It is the induction of premature delivery after the period of viability of the child. By this procedure a rational, and it appears to me a perfectly warrantable, means of avoidance of a great danger is offered to us; one which presents in itself no dangers comparable with those of non-interference, and one which, while it removes the absolute hazards attendant upon delay, relieves that wearing anxiety which harasses patient, friends and physician.

Fortunately this condition is usually announced during the last months of utero-gestation by premonitory signs of reliable character, and thus we may empty the uterus before the vital forces of both mother and child are exhausted by hæmorrhages, the result of repeated detachments of the placenta. My conviction is that, in every case of undoubted placenta prævia, in which the flow of blood threatens, by its amount or frequent recurrence. the loss of mother and child, premature delivery should be induced. What objection can be urged against it, other than that a child of less than nine months of intra-uterine life does not have as good a prospect of life as one which has arrived at full term? In the case which we are considering, even this is invalidated by the fact that an eight months' child out of the uterus, and depending upon pulmonary respiration, has a decidedly brighter prospect for life than one in that cavity depending for aeration of its blood upon a crippled and bleeding placenta. For the mother, how incomparably greater the safety which attends an empty and contracted uterus! By inducing delivery during the ninth month of pregnancy, we should be dealing with a woman who is not exhausted by repeated hæmorrhages; we would be in attendence at the moment of cervical dilatation, and consequently the moment of danger; and we would be able by hydrostatic pressure to control hæmorrhage in great degree, while at the same time the period of dilatation of the cervix, which constitutes the time of maximum danger, may be rapidly accomplished. Under these circumstances, in the words of Angus McDonald, "nothing can be gained by delay, if we are satisfied that the bleeding is really serious, and if continued would lead to great risk to the mother's life and health."

With these considerations before me, and with a certain amount of experience to support them, I can not resist the conviction that, when premature delivery becomes the recognized and universal practice for placenta prævia, the statistics of the present day will he replaced by others of a far more satisfactory kind.

I freely admit that this must be proved hereafter by absolute clinical demonstration ; and one of the objects of this paper is to offer a small amount of such proof. As freely do I admit, too, that evil may arise from an injudicious and unwarrantable resort to this plan of treatment in cases of a character too trivial to call for such radical interference. But does not this objection apply to every resource in surgery? The method being a good one, we must rely for its judicious application upon the good sense and conservatism of the individuals who resort to it. There is not an operation in obstetric surgery which is not sometimes performed upon insufficient grounds, and to the detriment rather than the benefit of the patient in whose behalf it has been invoked. So will it be with this measure. But let the misguided practitioner bear the burden of his own error; the operation should not be made to do so for him.

Upon those practitioners who have used with satisfaction the tampon until version has become practicable, and who, in reliance upon these excellent and efficient means, set their faces against the innovation here advocated, I would urge a thoughtful consideration of the statistics of placenta prævia. Accepting those offered us by Simpson, Read and Trask, approximatively, the prognosis for the mother is about as grave as that of patients submitted to the capital operation of ovariotomy. For the child it is much graver. We must, therefore, either regard the statistics to which I have made allusion as utterly worthless and unreliable, for which conclusion no warrant whatever exists; or we must admit that the claims of any means which offers immunity, to any decided degree, from the ordeal of so dangerous a parturition and labor, should be most carefully weighed before being thrown aside.

Five years ago a practitioner in this city, a man of very large obstetric experience and decided views as to practice, consulted me about a case of placenta prævia. His patient, a multipara, had, during the eighth month of utero-gestation, had repeated and severe losses of blood. Though much weakened by these she had, at the time of my becoming connected with the case, arrived at the end of the first week of the ninth month. Every symptom, both rational and physical, pointed to the existence of placenta prævia, and I urged premature delivery on these grounds : First, the child was alive and might now be saved, while it ran greater risks than those attendant upon this process from hæmorrhages which were sure to occur during the next three weeks. Second, the mother had bled very profusely, and might at any time bleed to death, or at least to a point of anæmia which would render even natural delivery dangerous. Third, even if the pregnancy could be carried to term, it was almost certain that during labor so severe a loss of blood would occur that version would be necessary, which would, in the exsanguinated condition of the patient, prove a dangerous resource.

I pressed these considerations strongly, but without avail. The doctor had relied heretofore, through a long practice, upon the tampon and version, and would rely upon them now; the bridge that had so often borne him in safety would probably do so now. He agreed, however, to compromise the matter thus : the husband was to seek him instantly in case of another alarming hæmorrhage; he would send at once for me, and we would empty the uterus forthwith. In forty-eight hours from that time, at three o'clock in the night, the husband was awakened by a cry from his wife that she was flowing freely. As rapidly as possible he went for the doctor, and then for me; but over an hour was consumed before we could reach the patient, owing to the necessary delay in dressing on the part of the husband and ourselves, and the time occupied in traversing the distance between our own houses and that of the patient. Arriving there we found her lying dead in a mass of blood, which filled the bed and dripped through the mattress in a stream. The child was at once delivered in the forlorn hope that it might still be alive, but it likewise was dead. The placenta was found to be centrally attached.

It may very pertinently be asked whether I believe that premature delivery, practiced when I urged its adoption forty-eight hours before this, would have saved one or both of these lives ? I unhesitatingly reply, I do; in all probability the life of the child, and almost surely that of the mother. I do not say that I feel sure of this, but I do say that such is my decided belief, based upon no theory worked out in the closet, but upon experience founded upon clinical facts, which will close this essay.

A few words now upon the history of the introduction into practice of the use of premature delivery as a means of prophylaxis in placenta prævia. In 1864 Dr. Robert Greenhalgh, of London, read before the Obstetrical Society of that city an essay entitled "Practical Remarks upon the Treatment of Placenta Prævia, with illustrative cases," in which he advocated this practice. Judging by some of the statements made in the discussion to which this essay gave rise, we must believe that the practice was a recognized one in Great Britain before this time. Dr. Barnes agreed "generally in the proposition that it was desirable to bring on labor in cases of flooding due to placenta prævia." Dr. Hicks "quite agreed with Dr. Greenhalgh as to the necessity of inducing labor in placenta prævia as soon as arrangements could be made, which he believed to be the plan adopted by all who saw much midwifery in this city; it was the practice he had always adopted." Dr. Hewitt considered the "principle enunciated in the paper now read, of the necessity of interference in cases of placenta prævia, to be one of great value. This principle had never been sufficiently insisted on, and although admitted by men of experience, it had not been laid down as a principle in the obstetric text-books." Dr. Beatty, of Dublin, declared that "in this respect (premature delivery) there was not much difference between his (Dr. Greenhalgh's) and the practice very usual in Dublin." Dr. Oldham, the president of the society, "also agreed that it was important to take steps at once in any case of placenta prævia to accomplish delivery; a plan, he thought, admitted by most practitioners in London, and one upon which he had always acted."

And yet I know of no work, essay, or text-book, which gave this advice at any time previous to the appearance of Greenhalgh's paper. He too, *practicing in London and associating* freely with his professional brethren, *seems evidently to have looked* upon the plan which he proposed as entirely an innovation. With the proof at present before us, it appears to me that to Greenhalgh belongs the credit of systematizing and formulating this method of managing placenta prævia.

Four years after this (1868), ignorant of the fact that I had been anticipated by Greenhalgh, and imagining myself to be the pioneer in the practice, I published, in the first issue of the New York Obstetrical Journal, a paper entitled "the History of Eight Cases of Placenta Prævia," in which I advocated this procedure, and gave several cases illustrative of it. In 1875 Angus McDonald, of Edinburgh, published a good essay upon the subject in the Obstetrical Society's Transactions of that city; and in 1875 and '76, articles indorsing the method appeared in the Amercan Practitioner from the pen of its able editor.

I have now resorted to premature delivery in eleven cases of placenta prævia; and although some of them have already appeared in print, I lay them all before my readers as embodying the sum total of the premises from which the deductions of this paper are drawn.

CASE I. Mrs. W., aged twenty-six, primipara, in good health, was suddenly taken with hæmorrhage three months before full term. She sent for me in great haste, but being occupied I was unable to go to her, and she was seen for me by my friend, Dr. Reynolds. He discovered that she had lost a few ounces of blood, but that the flow had ceased. Three days afterward she was again affected in the same way, the flow ceasing spontaneously. About a week after this she was taken during the night with a flow, which was so profuse as to result in partial syncope when she endeavored to walk across the room. I saw her early the next morning; found her flowing slightly, and upon vaginal examination succeeded in touching the edge of the placenta through the os, which was dilated to the size of a ten-cent piece. Later in the day Drs. Metcalfe and Reynolds saw her, and agreed with me in the propriety of premature delivery. In accordance with this determination, at 7 P. M. I introduced into the cervix, with considerable difficulty and by the employment of some force, the smallest of Barnes's dilators. This was followed in twenty minutes by the next larger dilator, and in an hour by the largest. Dilatation was rapidly accomplished, but instead of removing the largest bag, I left it in cervix until ten o'clock that night. Expulsive pains coming on at that time I removed it, when the head rapidly engaged, and before morning Mrs. W., was safely delivered of a living girl. The placenta followed rapidly, and both mother and child did well.

In this case, though hæmorrhage continued slightly throughout the labor, it never amounted to a sufficient quantity to endanger the lives of either mother or child. The implantation of the placenta being lateral, cessation of the flow occurred as the head advanced and made firm pressure against the bleeding surface. As to the fact of the case being one of placenta prævia, there could be no doubt. The placenta was distinctly touched by Drs. Metcalfe and Reynolds and myself; one lip of the cervix was disproportionately developed, and the placental murmur was much more distinct over the symphysis than near the fundus.

CASE II. Mrs. D., a lady over forty years of age, whose last pregnancy had been completed fourteen years previously, was placed under my care by Dr. Metcalfe. She was an excessively nervous and hysterical woman, but in good health. About three weeks before full term she was taken with hæmorrhages, which lasted for very short periods, recurred at intervals of four or five days, came on without assignable cause, and ceased without remedies. The cervix was not dilated, and no physical signs of placenta prævia could be detected either by vaginal touch or ascultation. Dr. Metcalfe saw her in consultation, and as all the rational signs of placenta prævia were present, and our patient was suffering from the repeated losses, and becoming extremely nervous and apprehensive, we concluded to bring on premature delivery. Accordingly at 11 A. M. I introduced a large sponge-tent into the cervix, and at 3 or 4 P. M. removed it, and succeeded in inserting Barnes's smallest dilator. At nine o'clock that night the cervix was fully dilated, very slight hæmorrhage having taken place, and Dr. Metcalfe being present, I removed the bag, intending to leave the case to nature, provided no flow occurred. Previously during the evening, upon changing the bags, I had distinctly touched the head at the presenting part; but now, to my surprise, I found that the bag impinging on this part had caused the child to revolve in the liquor amnii, and that the breech was within the os. We decided, under these circumstances, to deliver at once. The patient being put under the influence of ether, I drew down the legs and delivered a living female child. The placenta followed in fifteen minutes, and both patients did well, the child rapidly recovering from an injury to one of its legs received during delivery.

In this case the placenta was very nearly centrally attached. At one side of the os internum, a space of only two fingers' breadth was free. Through this digital examinations were made and the hand pushed to seize the feet. The first stage being accomplisned by means of the hydrostatic dilators, no hæmorrhage attended it; but without the employment of this means, it is highly probable that profuse and dangerous flooding would have occurred.

Case III. Mrs. L., a multipara, aged thirty-five years, was placed under my care by Dr. W. H. Van Buren. Although not yet advanced much beyond the seventh month of pregnancy, she had often recurring attacks of hæmorrhage, which behaved precisely like those of placenta prævia. The patient was intractable, fretful and unreasonable, to such a degree that I found much difficulty in examining very complely, and to this circumstance I, in part, attribute the fact that no physical signs of the condition could be detected. After attending her for a week, I was suddenly called to her and found that she had lost so much blood as to be alarmingly prostrated. I at once introduced a Sims's speculum, and applied a firm tampon of wet cotton. This was removed in twelve hours, and replaced by another. Before the removal of this, full doses of ergot were administered, and in a few hours a still-born child, with placenta and membranes, was cast off. The mother recovered slowly.

Case IV. Dr. Metcalfe requested me to see with him Mrs. D. R., of whom he gave me the following history: She was a multipara, in good health, and in the eighth month of pregnancy. Without assignable cause she was affected by recurring hæmorrhages of considerable violence, for which he had been forced to use the tampon. Upon my seeing her, we agreed to employ the colpeurynter, Barnes's dilators not being attainable, and it was faithfully tried. For a time it would control the flow, but it excited violent efforts of the abdominal muscles without bringing on labor. In four or five days the patient became so much exhausted that we were apprehensive as to the result. The os was half dilated, fœtal heart inaudible, and hæmorrhage occurring at intervals. The patient was anæsthetized with ether, and Dr. Metcalfe passed his hand slowly into the cervix and removed the entire placenta. After this all flow ceased; the child was delivered in twenty-four hours, and the patient recovered without a bad symptom.

Case V. I was called on the 14th of November, by Dr. Keeney, to see with him Mrs. R., a multipara, aged twenty-three years, who was nearly at the end of the seventh month of pregnancy. About one week before our visit she had been suddenly seized with quite a profuse hæmorrhage, which had rapidly diminished, but never completely disappeared. The nature of the flow, which occurred by sudden gushes in great profusion, led us to the conclusion that it was due to placenta prævia; but as the period was not favorable to the viability of the child, we determined to avoid interference until the eighth month, if possible. The patient was accordingly kept quiet in bed, and all effort avoided. For two weeks and a half this plan appeared to succeed, and we had strong hopes of reaching a period when both mother and child might be saved by premature delivery. When the seventh month and one week of the eighth had passed, the flow returned, and continued so steadily that, to our regret, we were forced to empty the uterus in the interest of the child, which was evidently becoming much enfeebled by gradual placental detachment, as well as of the mother, who likewise felt the loss of blood very perceptibly. At this period Dr. Keeney and I met at the patient's house at half-past eight o'clock in the evening. At twenty minutes before nine, I introduced Barnes's smallest dilator. At ten minutes after nine the os was fully dilated, and I, introducing my hand, readily delivered a living child by version. The child was evidently very feeble, and although at once wrapped in cotton and surrounded by an atmosphere heated to ninety-five degrees, it lived only about nine or ten hours.

In this case, as soon as the os was fully dilated, we could distinctly feel the placenta; and as I passed up my hand I found that it was centrally attached. The mother made an excellent recovery.

CASE VI. Mrs. P., a multipara, aged thirty-eight, had advanced, without any unfavorable symptoms, to the middle of the ninth month of pregnancy. At this period, while sitting, at 9 P. M. in her parlor, engaged in some light needle work and in conversation, she suddenly felt a free flow of blood pouring away from the vagina. In a few moments she became very much exhausted, and was lifted up by her husband and carried up stairs to bed. I saw her within an hour after this, and found her still losing blood to a slight extent. Her pulse was very rapid and weak, and her face extremely pallid. It was estimated that about one quart of blood had passed, though this was of course uncertain.

As the flow had ceased after I had kept the patient quiet for an hour, I left the house, promising an early visit in the morning. Upon this visit I found her doing well, though somewhat exhausted. Having satisfied myself that placenta prævia existed, I now explained the state of affairs to my patient's husband, and requested Dr. Metcalfe to see her in consultation. He agreed with me that the probability of the safety of both mother and child would be greatly increased by at once inducing premature delivery, and at 9 o'clock that night I set about accomplishing it. At half past nine exactly, in the presence of Dr. Metcalfe, I introduced into the cervix the smallest size of Barnes's dilators, and at half past ten the os was fully dilated. So long as the bag was retained in the cervix, no hæmorrhage occurred, but on the instant of its removal a flow took place. Under these circumstances, it was thought best to deliver at once. The patient being put under the influence of chloroform, I performed bimanual version, and with great ease delivered a living child. The placenta soon followed, and mother and child recovered without an unfavorable symptom.

In this case delivery was accomplished in one and a half hours from the commencement of the effort, and the process was inaugurated just twenty-four hours after the development of the first symptom of danger. The flow which constituted this symptom was so sudden and alarming that we thought that great danger would attend delay, uncompensated by any corresponding advantage. After full dilatation and removal of the dilator, Dr. Metcalfe examined and found a very large piece of placenta hanging out of the os uteri, and thus the diagnosis was proved to have been correct.

CASE VII. I present this partly in the words of Dr. Gilchrist, with whom I saw it in consultation: "Mrs. R., a primipara, ceased to menstruate about the 26th of May. On the 15th of October she had a slight hæmorrhage, the show continuing for a day, followed by others on the 7th and 21st of November, 9th and 28th of January, and 16th of February; all coming on about four o'clock in the morning, lasting about the same length of time, and from one to two ounces each time. Friday morning, February 23d, on rising to void urine, she lost at least a quart of blood in a few minutes, stopping almost entirely as rapidly as it came. She had little, if any, on Saturday. On Sunday she had two gushes, losing nearly a pint each time, followed by a slight loss and some irregular pains, until Monday afternoon, when Dr. Thomas saw her with me in consultation."

I now continue the history. At the time when I saw Mrs. R. with Dr. Gilchrist, she was exceedingly exhausted from prolonged and copious losses of blood; and in view of the fact that she had still two weeks to go before reaching the full period of gestation, that her child appeared to be still alive, and that it appeared highly improbable that either her strength, or that of her infant, would withstand other losses, I urged an immediate resort to premature delivery. At this time the edge of the placenta could be distinctly felt by the finger inserted into the cervical canal and it was looked upon as almost certain that other losses would occur, Dr. Gilchrist gladly accepting the proposal of premature delivery, inserted the smallest of Barnes's dilators at eight o'clock that night. At half past nine, the second size was inserted; and at ten o clock he sent for me declaring that the patient's condition was a very unsatisfactory one. When I met him at this time I found that, without creating hæmorrhage, he had accomplished a good, though not complete, dilatation of the os. But the patient had become very nervous, and was tossing her arms from side to side; the respiration was sighing, pulse small and rapid, and some loss of blood was occurring. The outlook for a lengthy labor was very bad; so with Dr. Gilchrist's concurrence I at once introduced the largest dilator, and having fully dilated the os externum, gently turned by the bimanual method,and delivered a fine boy. The child did perfectly well and the mother slowly recovered. Her health, in the course of a month, was remarkably good, when the great loss of blood which she sustained was taken into consideration.

CASE VIII. I was called by Dr. T. M. Markoe to see with him Mrs. A., a multipara, who was in the last month of pregnancy. Four weeks before I saw her she had had a profuse uterine hæmorrhage, and this had been repeated with considerable regularity about every five days until the night previous to my visit, when the fifth flow had occurred. The patient was greatly exsanguinated, and as we satisfied ourselves, by a careful examination of the rational and physical signs, that placenta prævia existed, and that still more profuse losses would almost surely occur, we decided upon interrupting the process of gestation. In view, however, of the very exhausted condition of our patient, we agreed to wait four days before doing this. At this time, in the presence of Drs. Markoe and Delafield, I dilated the cervix with water-bags, and as a decided flow of blood attended this process throughout, we decided to turn. This I succeeded in doing, ripping the placenta away from the cervix to which it was centrally attached, and delivered a still-born male child. Then I at once delivered the placenta. The mother did well, with the exception of a slight attack of plegmasia dolens, which did not last long.

A more aggravated case of cervical attachment of the placenta than this never presented itself to me. Whether the child's life was lost during the delivery, or whether it was destroyed by the previous hæmorrhages, I am unable to say.

CASE IX. Mrs. T., multipara, at the end of the eighth month of pregnancy, was put under my care by Dr. H. B. Sands, for a condition which he regarded as placenta prævia. During the seventh and eighth months of pregnancy she had, at intervals, suffered from temporary but profuse losses of blood, which, with the physical signs present, led me to agree in Dr. Sands' diagnosis. For a week after I saw the patient she was carefully watched for me by Dr. Charles S. Ward, and as during this time very decided hæmorrhage occurred, and the patient was becoming much exsanguinated, premature delivery was decided upon. Dilating the cervix fully with Barnes's dilators, I slipped up between the membrane and uterus a gum-elastic catheter, even after it was put in place keeping a dilator in the cervix. In three or four hours labor pains were developed, very little blood having been lost, and under the supervision of Dr. Ward the patient was safely delivered of a vigorous male child. The child did well, but in forty-eight hours after delivery puerperal septicæmia developed itself in the mother, of which she died. One month after this Dr. Sands attended a sister of this lady in the same honse, who, after a perfectly natural labor, died of puerperal fever.

CASE X. Mrs. C., wife of an army officer, a primipara, living in the suburbs of New York, sent for me in great haste, in the early part of the eighth month of pregnancy, on account of a uterine hæmorrhage which had occurred during the night without assignable cause. When I reached her the hæmorrhage had ceased, but as it recurred with some violence three times during the following month, and as the physical signs led me to believe that placenta prævia existed, I induced premature labor when the pregnancy was eight months and a half advanced, and had the good fortune to deliver a living, though greatly enfeebled, child. Mother and child both did well, and the former, who has borne several children since, has had no repetition of this dangerous experience.

CASE XI. I was called, by the late Dr. J. J. Connolly, to see with him Mrs. M., a young Irishwoman, wife of a mechanic, in whose case he had diagnosticated, on account of frequent hæmorrhage and the ordinary physical signs, placenta prævia. Upon examination of the case I fully agreed with him, and as the patient was now advanced to the eighth and a half month of pregnancy, was becoming greatly exhausted, and the child appeared to be dead, we decided upon premature delivery. This was induced by Barnes's dilators and uterine catheterization. A still-born child was delivered, and the mother recovered without a bad symptom.

In this case the placenta was attached laterally, where it could be distinctly felt after dilatation of the canal. While compression was made by the water-bag a little hæmorrhage occurred from it; but as soon as the membranes were ruptured, and the head made pressure against it, this ceased entirely.

From this enumeration of cases I have excluded all in which means were adopted for expediting labor after it had been established from natural causes. I have confined myself strictly to cases in which the labor was induced as a prophylactic measure in placenta prævia.—T. GAILLARD THOMAS.

PLACENTA, Retention of.—Adhesions of the placenta to the uterine parietes may cause hæmorrhage, especially if they are partial, and the remainder of the placenta be detached. The frequency of these has been over-estimated. Many cases believed to be examples of adherent placenta are, in reality, only cases of placenta retained from uterine inertia. The experience of all who see much midwifery will probably corroborate the observation of Braun, that "abnormal adhesion and hour-glass contraction are more frequently encountered in the experience of the young practitioner, and they diminish in frequency in direct ratio to increasing years."*

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* Braun's Lectures, 1869.

The cause of adhesion is often obscure, but it most probably results from a morbid state of the decidua, which is produced by antecedent disease of the uterine mucous membrane, then the adhesion is apt to recur in subsequent pregnancies. The decidua is altered and thickened, and patches of calcareous and fibrous degeneration may be often found on the attached surface of the placenta. Most frequently the placenta is only partially adherent; patches of it remain firmly attached to the uterus, while the rest is separated; hence the uterine walls remain relaxed, and hæmorrhage frequently follows.

There are no very reliable signs to indicate morbid adhesion of the placenta, previous to the introduction of the hand. The following are the symptoms as laid down by Barnes, any of which might, however, accompany non-detachment of the placenta, unaccompanied by adhesion: "You may suspect morbid adhesion, if there have been unusual difficulty in removing the placenta in previous labors; if, during the third stage, the uterus contracts at intervals firmly, each contraction being accompanied by blood, and yet, on following up the cord, you feel the placenta *in utero;* if on pulling on the cord, two fingers being pressed into the placenta at the root, you feel the placenta and uterus descend in one mass, a sense of dragging pain being elicited; if, during a pain the uterine tumor does not present a globular form, but be more prominent than usual at the place of placental attachment."*

Treatment of Adherent Placenta.—The artificial removal of an adherent placenta is always a delicate and anxious operation, which, however carefully performed, must of necessity expose the patient to the risk of injury to the uterine structures, and of leaving behind portions of placental tissue, which may give rise to secondary hæmorrhage, or septicæmia. The cord will guide the hand to the site of attachment, and the fingers must be very gently insinuated between the lower edge of the placenta and the uterine wall; or, if a portion be already detached, we may commence to peel off the remainder at that spot. Supporting the uterus externally, we carefully pick off as much as possible, proceeding with the greatest caution, as it is by no means easy to distinguish between the placenta and the uterus. At the best it is far from easy to remove all, and it is wiser to separate only what we readily can, than to make too protracted efforts at complete detachment. When it is found to be impossible to detach and remove the whole, or a great part of the placenta, we cannot but look upon the further progress of the case with considerable anxiety. The retained portions may be, ere long, spontaneously detached and expelled, or they may decompose and give rise to fetid discharge and septic infection. Such cases must be treated by antiseptic intra-uterine injections, so as to lessen the risk of absorption as much at possible; but until the retained masses have been expelled, and the discharge has ceased, the patient must be considered to be in considerable danger. In a few rare cases, there is reason to believe that considerable masses of retained placental tissue have been entirely absorbed. It is difficult to understand so strange a phenomenon, but several well authenticated cases are recorded, in which there seems no reason to doubt that the retained placenta was removed in this way.†—W. S. PLAYFAIR.

PLAGUE.—*Etiology.*—This disease is of a specific nature, and generally prevails as an epidemic, but may be sporadic. Formerly it was met with in Europe, but at the present time its chief seats are Egypt, Syria, Asia Minor, and the coast of Barbary. It is undoubtedly contagious, and can be conveyed in various ways. The chief predisposing causes are overcrowding and bad ventilation, want of cleanliness, with accumulation of filth, insufficient and unwholesome food, debility from any cause, a warm and moist condition of the air, residence on marshy soil, or in the neighborhood of certain rivers. Epidemics often follow famine, and are generally preceded by a sickly, oppressive, warm, and moist season.

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* Obstetric Operations, p. 446.

† See an interesting paper by Dr. Thrush on "Retention of the Placenta in Labor at Term." *Am. Jour. of Obstet., July,* 1877.

Anatomical Characters.—The blood is dark, and remains fluid or coagulates imperfectly, while it rapidly putrefies. All the organs are greatly congested and softened, especially the spleen; also the mucous and serous membranes, which may present petechiæ and ecchymoses. The serous cavities contain more or less effusion. The absorbent glands generally are swollen, dark, softened, or disintegrated. Buboes and carbuncles are usually present.

Symptoms.—Plague is characterized by fever, generally of a low type, with the local development of buboes, carbuncles, and petechiæ. The period of incubation is very short, and symptoms may set in almost immediately after exposure to infection. After inoculation, the distinctive glandular swellings are developed in four days. The invasion is sudden in most cases, and the severity of the constitutional symptoms varies from a slight fever to one of the most virulent type. The early symptoms are rigors, restlessness, a feeling of debility and languor, headache and giddiness, nausea or vomiting, and præcordial oppression or uneasiness. The expression is heavy and stupid, and the eyes look muddy or suffused. Soon the temperature rises, while prostration increases, with a tendency to syncope. The pulse is frequent, but weak or irregular. The tongue is thickly furred, and tends to become dry and brown or black, with sordes on the teeth. The other prominent symptoms are vomiting, sometimes of black matters, great thirst, diarrhœa with offensive stools, hurried respiration, and very foul breath. The urine is much diminished in quantity, and may contain blood. Hæmorrhages from mucous membranes are not uncommon. Nervous symptoms are generally present, such as delirium, stupor, coma, or convulsions. Death may take place before the appearance of any local signs.

Buboes are formed chiefly in connection with the glands of the groin, but are also seen in the axilla, and about the angles of the jaws. They appear at different periods, being preceded by darting pains. Generally they form abscesses, which discharge and heal slowly, leaving permanent scars. Carbuncles are observed mostly on the limbs, but may affect any part of the body. They vary in number and size, and are liable to end in gangrene, sometimes thus causing great destruction of tissues. Petechiæ, vibices, and livid patches are seen only in bad cases, and there may also be extravasations of blood into the subcutaneous tissue in such cases.

Prognosis is very grave.

Treatment.—Attention to all hygienic measures is essential. The bowels should be freely opened. An emetic at the outset is recommended. Nutritious food, stimulants, mineral acids, and tonics are the remedies which afford the best results. Probably those who advocate the use of antiseptics would give them largely in this disease. Cold affusion or sponging may also be employed. Poultices are indicated for the buboes and carbuncles, followed by antiseptic dressings when they are discharging.—FREDERICK T. ROBERTS.

PLAGUE, COLD—*See Cerebro-Spinal Fever.*

PLANTARIA—*See Dengue.*

PLEURODYNIA—*See Muscular Rheumatism.*

PLEURISY.—Inflammation of the pleura differs from that of the arachnoid, from the fact that the exudation is never on the attached surface, but is found directly in the pleural sac itself. If it is serum it will be found first in the most dependent part of the sac. If plastic matter is effused it may be in the most dependent portion, but generally it remains on the membrane from which it exuded, and covers the whole surface. This causes the lung to adhere to the ribs. The respiratory force will cause the lung to move, but it goes with a jump. The organization going on, the adhesion will be more complete and the lung at the end of twelve or fourteen days is completely fastened to the ribs. One form of pleurisy results in the exudation of much lymph with some effusion of serum. This is acute pleurisy. When there is a moderate amount of lymph with a great quantity of serum, it is sub-acute pleurisy, hydrothorax, or pleurisy proper. When there is pus in the pleural cavity as a product of inflammatory action it is called empyema. There is another form associated with a perforation of the lung and the introduction of air, which is called pneumothorax. In any case there is usually inflammation of the entire membrane.

Acute Pleurisy.—A very few times in your life will you meet with this form of pleurisy. You will suddenly be called to a patient who has been seized with intense pain in his side, which has come on suddenly. If he has been sitting up he is pressing the affected side with his hand to prevent motion of the ribs as far as possible. If he is in bed he will be upon the inflamed side. As a rule pleurisy does not begin with a chill; countenance is pale; pulse is tense and frequent. But you cannot be sure of your diagnosis before you get the friction sound; for the first few hours you will not be able to get this sound, the fibrinous exudation not having had time to form or produce it. This sound is generally double, occurring both with expiration and inspiration, but it may be single. Lænnec compares it to the sound produced by new leather. When this is heard the disease can scarcely be confounded with any other.

This disease by common consent is better controlled by the lancet than any other serous inflammation. Cups with scarifications are to be applied to the affected side, these may be repeated two or three times after proper intervals. When the pain has subsided, blisters may be applied to overcome whatever inflammation remains. The treatment then must be decidedly antiphlogistic to prevent abundant effusion. There is no occasion for diuretics. Diaphoretics are made use of in the latter stages. Fomentations of warm water and the like may be applied to the affected side. Not much constitutional treatment required. This membrane, in cases which recover, is left and is organized. Contraction of side and shortness of breath will occur in every form of pleurisy. This does not take place until several weeks after the attack and continues for three or four years, during which time the membrane becomes absorbed.

Sub-Acute Pleurisy.—In this form there is a large amount of serous fluid with a moderate amount of lymph. The disease was formerly called hydrothorax. It is insidious in its attack and is attended with no pain unless it proceeds from the acute form. You will not probably see these cases until the disease has made considerable progress. The diagnosis will especially be with phthisis from the protracted cough, paleness and emaciation. There will always be a cough which is almost dry, there being but very little expectoration. The character of the expectoration will be different from that of phthisis, in being tough and accompanied by frothy mucus. There is shortness of breath and poor appetite. The pulse is frequent—these are about all the rational signs. But we have the physical signs, which are diagnostic. The disease is almost always upon one side. The pleural cavity contains a pool of water and upon this are founded the *physical signs.* First of inspection. There is a filling out of the *intercostal spaces, especially* at the lower part of the chest. The ribs are elevated and fixed, not moving in respiration. By measurement we ascertain that the affected side is the largest. There is absolute dulness on percussion as far as the fluid extends. From the condensation of lung tissue the resonance will be less than natural. In making this examination the ear must be applied as far down as the ninth rib behind. Over that portion of the chest which contains water there will be heard no respiratory sound, and when the chest is full of water no sound can be heard except at the root of the lung. Absolute silence in respiration always denotes one of three things—watery effusion, a large tumor, or pneumonia with fibrinous bronchitis. When we have,as in pneumonia, hepatization we will always get the respiratory sound which is tubular. This is a diagnostic mark between pneumonia and hydrothorax. When, in carrying my ear up to get the level of the water, I get the inspiratory and expiratory sound, I know I am over the lung, and that the sound is not a conducted one. Another mode of ascertaining the level of the fluid is by listening to the voice. Let the patient count, for this is better than talking. When we reach the level of the fluid, the voice sound which before was distinct and deep, will be full of resonance and in a low key. We shall also, in some cases, get a trembling sound, but upon his I do not rely. These, then, are the principal aids in the diagnosis, and when we get these there can be no doubt but that we have sub-acute pleurisy. I suppose a lung was never so compressed as not to admit air into the bronchial tubes. This, fortunately, is one of the diseases which we may expect to cure, but not without proper treatment. For a year or two, and very often through life, we shall have deformity of the chest if the effusion has been of any amount, and the case has been at all protracted. This arises from the shrinkage of the affected side after removal of the fluid, upon the principle that "*Natura abhoruet vacuo*," the adhesions preventing the complete restoration of the lung. We are also to notice the effect upon other organs. The heart is pushed to the opposite side of the fluid. The liver is crowded downwards, and once in a great while this organ is displaced.

Since the inflammatory nature of this trouble has been recognized, we have had great success in its management. While, when it was considered and treated as a mere dropsy, it was almost as fatal as phthisis. Being but a mild inflammatory action, it presents but few terrors to the physician, but for its course it will require from two to four weeks, on an average. Very few cases prove fatal.

We are, on the one hand, to subdue the inflammation, and on the other, to promote absorption of the fluid. Bleeding from the arm is unnecessary, but when we are called at an early stage, which is seldom the case, cups will be advisable, repeated as often as necessary. Over recent inflammations cups have great influence, while they do little good in sub-acute and chronic inflammations. As in other sub-acute inflammations, blisters are to be applied, and in doing this select three spots, one being placed on a new spot as the last has healed. Scarcely ever more than three are required. Now come active diuretics, and among these I prefer potass. iod. grs. xxx per day. If this does not subserve try potass. acet. et inf. digitalis ʒ iij to ʒ iv per day, or triplex diuretic pill, ℞ pulv. scillæ hyd. chlor. mit. aa grs. j. M. ft. pil No. j. cap. pil. ter in die, until the effect of the mercury is produced, then try potass. iod. again. In some cases mild counter-irritants, as the ammoniacal liniment, will answer, as in nervous women, but, as a rule, we are not to trust to these. Purgatives and vapor baths sometimes are useful. This treatment will suffice in ordinary sub-acute pleurisy, but when all these measures fail we have but two resources, to do nothing or to use the trocar. Some physicians advise the early use of the trocar, but from fear of changing the serous effusion to pus, I do not like the practice. In some cases we are forced to use the frocar, but beforehand always use medical means, if the patient is not rapidly sinking.

Empyema.—Here we have the purulent matter instead of, or with serum. It is not the grade of inflammation, but the constitution of the patient that gives character to this disease. The patient is apt to have chills and sweats, but we cannot rely upon the symptoms, as they are deceitful. From the greater constitutional disturbance we shall be more apt to call this disease phthisis. Cough is worse with a great amount of constitutional disturbance and expectoration. Try the common means in use for the last disease, and if they fail there is but one resource, viz.: puncture of the chest. Sometimes the pus has a tendency to point, from its being confined, as in an abscess. In these cases, as nature, though the best surgeon, is too slow we are obliged to help her, in many cases hastening the evacuation of the fluid contents. Now and then, instead of an opening being made through the external intercostal spaces, the pus makes its escape through a perforation through the lung. This is a most unfavorable issue, and such patients usually die. These perforations, in most cases, depend upon a softening down of superficial tubercles. In all cases of empyema we must expect to puncture several times. The practice is to incise the skin, plunge in a trocar and canula, and after withdrawing these instruments, insert into the opening thus made a linen tent, which should be fastened by its free ends to the chest by means of adhesive strips. This tent may be removed every day or two to allow the pus to run out. But I am partial to Dr. Wyman's method, as practiced by Dr. Bowditch, of Boston. It consists in the use of the exhausting pump, and for this purpose I like the ordinary stomach pump. We are to use an extremely small trocar and a common exploring needle as sometimes made, is a good instrument for this purpose, or better still, the aspirator with a fine trocar. Before introducing the instrument it is well to benumb the party by firm pressure with the finger. In these cases it is not necessary to use the scalpel as we do when a large trocar is used. After the trocar has been withdrawn the canula may be pressed in some distance as it will not hurt the lung if it touches it. Work the piston slowly. As the opening thus made is small it will close itself to the exclusion of air as soon as the canula is withdrawn. The last method is peculiarly desirable before we have ascertained that the effusion is purulent by a previous operation. When we know that the cavity contains pus I do not know which method is best. We are to continue to draw off fluid until oppression is felt at the sternum, and to guard against drawing off too much for fear of making a vacuum too great for the comfort of the patient. When the operation is performed in front it must be between the sixth and seventh rib, to avoid wounding the diaphragm. On the side we should choose between the seventh and eighth rib, and in the back between the eighth and ninth rib. I think that iodine injections for the prevention of further effusion of pus are attended with more harm than good. If I were to use injections of any sort I should prefer simple warm water. Tonics are more or less serviceable and this is about all that can be done in the way of treatment. Even under the best management we must expect half of these patients to die.

Pneumothorax With Empyema.—This is chiefly met with in persons having tubercles. The urgency of the symptoms will depend upon the degree of collapse of the lung. By applying the ear to the chest and requiring patient to count, we hear a hollow, ringing, and cavernous sound, which is called amphoric respiration. This metallic ring results either from a dropping of a portion of the fluid or from the bursting of a bubble of air. It resembles the sound produced by dropping a pin into a wine glass. Succussion sound is produced by shaking the fluid in a cavity which contains air and hence cannot occur in sub-acute pleurisy. It can only occur when air and fluid co-exist in the pleural cavity. The place where the amphoric resonance is heard with most distinctness will correspond to the situation of the perforation. Pus will only decompose when exposed to air or when in contact with dead bone which seems to act like a ferment. It is rare to get resolution of pus into gaseous matter when secluded from the air even out of the body. In pneumothorax the patient is siezed with violent spells of coughing from irritation of the fluids in the pleural cavity. During these fits of coughing this is expelled and the patient feels relieved until the pus again reaches the perforation. Furthermore the patient will be compelled to lie in that position by which the opening will be out of reach of the fluid. These cases are always desperate, for besides having two very fatal diseases (tubercles and empyema) associated with it, we have this last also. Our object should be to prolong life to the utmost limit by good food and stimulants. We may also apply with propriety some counter-irritant to the chest, as zinci iodid. Furthermore as it is better for the pus to escape through the walls of the chest than through the lung, we are to make a permanent opening.—Alonzo Clark.

PNEUMONIA.—Pneumonitis, pleuro-pneumonia, lung-fever—these are some of the names by which it is known, all referring to one affection. When we say pneumonia we mean the same thing as when we say pleuro-pneumonia. The pleurisy which accompanies the pneumonia is implied when the term pneumonia alone is used, but pleuro-pneumonia is more descriptive because pleurisy almost always goes with it. But of that by-and-by.

We say in general that pneumonia is an inflammation of the lung, but we can be a little more definite than that; it is an inflammation of that portion of the lung which serves the purpose of respiration; the functional portion of the lung. It is an inflammation of the lining membrane of the areolæ, as they are called a good deal now days; the air cells and the intra-lobular passages. I have already told you that there is almost always an abrupt termination of the ciliated epithelium of the bronchial tubes as it gets down into the lungs proper. The ciliated epithelium ends almost abruptly, and then comes pavement epithelium, very small, each particular cell not larger than a blood corpuscle. These line the air cells, and form a new structure, distinct from the ciliated epithelium. The ciliated epithelium is now no more wanted, but an exceedingly delicate membrane is required, through which the elements of the air can pass, and through which the gaseous material in the blood can pass, the carbonic acid gas for example, to pass out, and the oxygen to pass in. And you can easily comprehend that a delicate structure would be necessary for such a purpose. These intra-lobular passages are irregular tubes into which at the sides and ends the air vesicles open. Clusters of air cells communicate with this intra-lobular passage, or bronchiole (two names for one thing), and this particular structure is the lung. In other words it is the particular part of the organ in which the function is performed. That is the part which is the seat of pneumonia proper. To be sure the vessels that are outside of this lining membrane, that is the seat of the changes, the functional vessels of the lung, become the seat of stasis, and from them the effusions take place. A pneumonia generally begins in the lower portion of the lung. Not usually exactly at the bottom, but pretty well toward the bottom, and it spreads in both directions (if it does not begin absolutely at the bottom) until it occupies the whole inferior portion as well as the upper. It may occupy the whole of one lobe, and no more; it may pass the septum of the lobes and occupy a second lobe; it may, indeed occupy the whole of one lung. It is the right lung that is most subject to pneumonia; it is more frequently affected than the left—not as I once supposed, in two-thirds of all the cases, but in a very large majority. And the inferior portion, in a very large proportion, is the seat, as I have intimated. But there are instances in which pneumonia is called superior; in other words, instances in which it begins in the upper part of the lung, in the upper lobe, and extends downward. Pneumonia does not commonly affect more than one lung at a time, and yet we are not unfamiliar with double pneumonia. The lung becomes either half of it useless, or two-thirds of it, or, possibly the whole of it. It performs no function when the inflammation has come to its maturity; it does not receive any air in that part of it which should aerate the blood. Air enters the bronchial tubes and goes out again and makes a noise which enables you to recognize the pneumonia, but it does not enter the part where the function is performed. That is all plugged up, filled full of material that perhaps has just been consolidated; it is almost as firm to the touch as the lung itself. The lung increases in weight very greatly, consequently a portion of lung affected with pneumonia will sink in water; the healthy lung floats on it, as you know. It is estimated that a portion of lung affected with pneumonia, at its maturity, weighs ten times as much as the same portion in a healthy condition. The lung is expanded more or less by this process of inflammation. There is an effusion into its cavities, into the air cells, that distends them to a certain degree, and this pushes the lung against the ribs, and when you make a post-mortem examination of a person who has died of pneumonia you find the indentations of the ribs in the surface of the lung. The lung has pushed out the intercostal spaces, but it could not push out the ribs, and therefore the lines formed by the ribs are imprinted on it. Then, again, in listening to a patient who has pleuro-pneumonia you hear no friction sound indicating the pleurisy. The reason of that is that the lung is pressed against the ribs so firmly that it does not move up and down; it only has an expansive movement. Now, the changes taking place when a pneumonia is forming can, perhaps, be best explained by a reference to the structure of the air cells themselves. For example, suppose this to be one of the bronchioles (making a diagram), and suppose here is an air cell that opens into it, the vessels are all about here; they form an outside coating, so to speak. These vessels are the seat of a stasis more or less complete, and an effusion begins in a manner described earlier in the course. It makes its way through the lining membrane of the air cell, and makes a coating on the inside, in the periphery of the air cell, and this goes on until the air cell is actually filled. Of course during this time there will be some of this plastic material (that is to be converted into a solid matter) at the opening of the air cell, so that when the air enters it will have to break through and cause a noise like the bursting of a bubble. This air cell becomes, then, in time, completely filled, and others in the same way, filling up always from the periphery and condensing toward the centre. When this air cell is full an interesting question arises: what fills it? You can take out on the point of a needle the material which fills one of these air cells, put it under the microscope, and examine it, and I may say here that these granulations that fill the air cells make a rough surface upon the torn lung. If you take one of these plugs and examine it by the microscope you will find always three things: First, a granular body, looking like a pus corpuscle, but less granular; it appears to me larger than a pus corpuscle. It may be a form of pus corpuscle. I have called it pneumonic-globule for want of a better name, or at any rate until it gets a better. Then, second, you find cast off epithelium. As the inflammatory effusion comes through the lining of the air cell it pushes off this very fine epithelium, and third, you will find in addition in this little plug some blood corpuscles of natural (?) appearance. Those are the three things you are sure always to find: *the pneumonic* globule, that substance looking very much like a pus *globule, but less granular;* the epithelial scales, and blood corpuscles.

This is an inflammation in which blood is always effused—not much, but enough to stain the plug that fills the air cell. In grown up persons you will almost always find, in addition to these three substances a considerable amount of fine, granular matter, hardly having form, except rounded to a certain extent. This may be visible fibrine, or it may be in some instances the material of the plug partly broken down. In children this granular matter is not usually seen developed at the time you are likely to make the examination. This material fills not only the air cells, but the intra-lobular passages also.

Now, in this you observe I have not said one word about fibrinous effusion, and I have not said one word about it because there is not a particle of it here. It is the fashion now-a-days to denominate the kind of pneumonia that I am describing, as croupous pneumonia, and one of the persons who calls it by this name was kind enough to define what he means by croupous pneumonia. He means an inflammation in which false membranes are formed. There is not a vestige of false membrane in the plug that constitutes the pneumonic granulation. I can have no patience with those who adopt that name, because it is altogether false. I do not know how the observant Germans ever fell into the error. They have examined as many pneumonic lungs as I have, I have no doubt. The phrase croupous pneumonia is being adopted by the profession all over this country. This being true, they should certainly have a definite idea attached to it, but let it be understood that in croupous (?) pneumonia there is no croup at all. The small bronchial tubes are sometimes lined with false membrane, but the air cell and bronchioles never.

The interesting part of this history now comes in tracing this particular plug that has filled up the air cells and the intralobular passages in its changes. If you take a lung that is affected with pneumonia, recently removed from the body, and make a section of it and leave it in a place overnight, where the air is damp and warm you will find that the red color is changed to gray, and if you cut down to see how far that change of color has penetrated, you will find that it is a very small fraction of an inch. Shave off an eighth of an inch of the surface that has changed color, and you will get red again; leave that for a time in the same moist, warm air, and it will undergo a spontaneous change to gray again. It is a common understanding with the profession that if the gray hepatization—I have not given the divisions of pneumonia yet, but I may anticipate this—occurs, it is invariably fatal, so in substance says Watson, that it is a purulent infiltration. Now, gray hepatization is absolutely necessary to the recovery of a person who has the red; there is no way to get from red hepatization to health but through gray hepatization, but I will demonstrate that to you as I go on.

Now, as the pneumonia goes on, the first change that takes place in this plug is that it loses its color, just as the pneumonic lung exposed to the damp, warm air, loses its color, and for the same reason changes occur in the hæmatine of the blood that causes it to lose its red color, and indeed to have no color. The blood corpuscle remains, but is colorless. You may find some difficulty in distinguishing it from the epithelium that has been thrown off from the wall of the air cell. You will make the distinction, however, from the fact of the red-blood corpuscle being rounded, the epithelium being shaped so as to match other scales of epithelium. The lung thus becomes gray, and in the first period of its losing its color it is still firm—no softening; but as time goes on, two or four days are enough to produce breaking down of this plug, and the breaking down is effected by the healthy action of the blood in the blood vessels; stasis is removed, the blood begins to circulate healthily in this tissue of vessels, and the irritation of this plug causes a serous secretion from this wall of the air cell, which will soften, and gradually cause removal of this plug. A part of it is expectorated; I suppose in young persons almost the whole of it. Now if you take some of this expectorated matter and examine it by your microscope side by side with a specimen from the dead-house—that is, a recently-inflamed lung—you will find that the patient has coughed up just those same materials that are found in the lung and nothing more, except what comes from the bronchial tubes and the mouth, but the blood coloring matter will not be there. This plug softens and is removed, and new epithelium forms upon the wall of the air cell, and now everything is restored, as good as new. Pneumonia leaves no secondary marks in the lung. The lung, I say, is as good as ever. It is true the pleuritic effusion may cause adhesion, but the lung itself is fully, completely restored.

Now, you are ready for the divisions that have been given to this disease. There is the first stage, and there is a first stage before that, but I will not confuse you with that just now. There is the first stage, or the stage of engorgement; a second stage, or stage of red hepatization; a third stage, or stage of red hepatization, and in this your books, almost all of them, will tell you there is purulent infiltration. I told you that there is no more purulent infiltration in the third stage of pneumonia than there is in the second. Whenever that pneumonic globule is found to be a pus globule then there is purulent infiltration in the second stage of pneumonia, and it is continued into the third. Now, mark these stages as indicated by the changes in the lung. The first stage is that period during which the effusion is filling the air cell, the inflammation has begun, it has made a certain degree of progress before the technical first stage of pneumonia begins, and that leaves room for me to say that there is a stage before the first, in which generally there is an œdematous effusion. The first stage—technical—is after the œdematous effusion, so that in truth it would not be wrong to make five stages of pneumonia instead of three, one preceding the technical first stage, one following the third, but of that by-and-by. The first stage occupies all the time during which the air vesicle is being filled by this new material. A portion of this new matter is pushed out of the inflamed parts, finds its way into the breathing tubes, and so out, and makes the pneumonic expectoration. The characteristic pneumonic expectoration then comes from the bronchiole air cell before the new material is dried into a plug Then, from the moment the effusion begins in the outer border of this air cell the first stage begins, and it continues all the time that this air cell is becoming filled. Now, all the affected air cells, supposing them to have a history occupying the same time, and filled, and the breathing portion of the lung is solid. Now begins the second stage, or the stage of red hepatization, as soon as the air cells are filled full, and that continues until the color changes, and at first there are no physical signs to indicate that change of color. The physical signs will be the same until softening of the plug begins. You will have the gray hepatization when the color changes, and you will have a softening as a part of it. If I were to divide pneumonia, then, into stages I would make the first the stage of œdema; the second stage, the filling of the air cell; the third stage, the full air cell of a red color; a fourth stage, the full air cell of a gray color; a fifth stage, the breaking up, or breaking down, and emptying of these cells of their plugs.

The fact that you get in the expectoration during the resolution of a pneumonia the same materials that you find in a recent completed inflammation, by a microscopical examination, is pretty conclusive proof that there is nothing added to the contents of the air cell during the technical *third stage.*

Now, you are prepared to follow me through the physical signs that indicate these several stages. I will not burden your memory with the new classification, but will adhere to that which is given in your books and in your general teaching. I made this division that you may see there is something more to it than is commonly described.

I have been somewhat repetitious in this description of pneumonia, because I wish to impress on your minds certain points that you cannot find explained in your text book.

I was explaining to you at the end of the hour when we were last together, the relation between the anatomical changes of pneumonia and the physical signs. I had begun by saying that as the air cell becomes gradually filled with a material that is to become consolidated, while it is yet semi-fluid it permits the air to pass through it, either at the opening of the cell, or in the bronchioles, so that a bubble or septum is broken, and a fine crepitation is produced. The first physical sign of pneumonia, then, is a fine crepitation, a crepitant rale, just like that which is produced in the smaller bronchial tubes in bronchitis. You cannot, therefore, make a distinction between bronchitis and pneumonia at this point, by the physical signs. The process of filling this air cell is going on steadily for perhaps a day, or a day and a half, and during this time until the cell is filled (after which time it will exclude the air), you will continue to have this crepitation. It is possible you may not get it except at the end of a deep inspiration; it is possible you may have to tell your patient to cough, and listen to the breath he takes before the coughing, which will be a full one. It is hard on inspiration only. But at length the air cell is filled, and its contents dried, forming a plug, and you can easily conceive that the access of air is cut off. After this plug is formed you have no more crepitation, unless it comes from an accompanying bronchitis; the respiratory murmur is gone, as well as the crepitation. The reason of that is, that the respiratory murmur is formed in the air cell, or in the intralobular passages, and these are filled full, plugged up wholly. But you now get a voice sound, and a breath sound, that are important. In anybody's breathing with a good deal of the spongy structure of the lung between your ear, when it is applied to the chest, and the bronchial tubes, you hear nothing of the bronchial breathing; that is, you hear nothing of the noise produced by the air passing through the bronchial tubes; you hear barely respiratory murmur which is produced between the bronchial tubes and your ear, but if by any means you can make this spongy substance of the lung a consolidated one, or nearly consolidated, you will get a conductor of sound, and you will be able to hear sounds (?) not exactly from the deepest portion of the lung but from a portion that lies under the superficial portion. As I breathe now there is a sound produced in my bronchial tubes exactly like that which you hear in pneumonia, but if you were to place your ear to my chest you would not hear it, it being covered or masked by the overlying lung and the respiratory murmur produced in this. Now, I say this respiratory murmur is gone, and the crepitation is gone unless it is produced in the smaller bronchial tubes, which is not very frequent. But, in place of it, you get a blowing sound, a tubular respiration; you get the sound of the air passing through tubes. It is called bronchial breathing, and you hear, also, when the patient speaks, what is called bronchophony. This all of you who are familiar with the Greek language, will perceive means nothing more nor less than voice in the bronchial tube. It is rather a loud, somewhat ringing sound. The bronchial breathing, then, and the bronchial voice, or bronchophony, are developed by the consolidation of the lung and belong to the second stage.

During all the first stage, that is, the period during which the air cells and the intra-lobular passages are being filled, you have a gradually increasing dulness on percussion. As soon as the walls of the air cells begin to be covered by this plastic matter which is the result of inflammation, the resonance of the chest is diminished, and it goes on diminishing until the intra-lobular passages and the air cells are filled, and then dulness is completed. You have, then, three signs at the beginning of the second stage: bronchial voice, the bronchial breathing sound, and nearly absolute dulness on percussion. This dulness continues until these plugs are gradually softened and they begin to be removed. It continues through the first part of the third stage to the period when the rales begin to return, in other words, until the plugs begin to be broken up. Then there will be a gradual diminution in the amount of dulness until the lung is clear. I told you the last time we were together how this plug is broken up by the serous secretion coming from the restored vessels through the lining membrane of the air cell; a serous fluid that infiltrates this mass, and softens it, causes it to break down, and finally brings it into a state in which it can be forced into the bronchial tubes, whence it can be coughed up. In this connection it is important to say that certain persons have pneumonia and do not raise anything. They are almost always persons advanced in years. In them the lung may clear up and be as sound as ever it has been; nothing is raised. There is but one solution of that problem, and it is this, that these plugs are not only broken up, but dissolved and carried away in the circulation, and it is possible that this process takes place in every pneumonia to a certain extent, leaving the residual material to be expectorated.

Here, then, we have for the first stage crepitant rales and growing dulness; for the second stage no rales at all unless they are produced in the bronchial tubes, and dulness on percussion, bronchial voice and bronchial breathing. For the third stage, in the earlier part of it, after the lung becomes gray, the same signs exactly; but when the plug is being broken up then there will be a return of rales. They will not be crepitant rales alone, but crepitant, subcrepitant and mucous, all mixed together. And it has been found convenient, for the sake of having one name to cover the whole, to call this the rale-rédux, the return rale. This continues until the lung is pretty well cleared out, until the air cells are emptied of their inflammatory contents, and then, after this, occasionally there remains a finer crepitant rale than that which belongs to pneumonia; but in most cases with the end of the rale-rédux you have the end of the physical signs, the resonance being restored. But, in a few persons, I say, you will find during their convalescence, when they regard themselves about well, some very fine crepitant rales, particularly when you listen closely to the back. This is on account of the presence of some of the serous fluid which remains after having performed its function, namely, the breaking down of the plug.

To distinguish between the crepitant rale of pneumonia and the crepitant rale of bronchitis, you have these two things to bear in mind, namely, that the crepitant rale of pneumonia occurs in one lung only, at any rate at first. We have double pneumonia, to be sure; that is, pneumonia may occur in both lungs in the same sickness, but it will not begin in both lungs at the same time. If you have double pneumonia, inflammation will be developed in one lung a day or two, or three, before it occurs in the other. Sometimes a patient is convalescent when it attacks the other lung, but more commonly it occurs in the progress of the first, so that even double pneumonia will not, in the beginning, confuse you. Then, again, the crepitant rale of bronchitis being double is associated with resonance on percussion, there being no dulness. Then, too, the expectoration is different, but it is a little too early to consider that.

The physical signs of pneumonia, then, are pretty clear. Taken in connection with the febrile movement, you have very little difficulty in making up your mind what you have in hand.

Now with reference to the rational signs. These, too, are pretty manifest. Except in drunkards and in certain feeble persons the primary pneumonia is indicated by a chill. The first symptom is often a chill. M. Grisolle studied this matter in two hundred and five cases at the Hotel Dieu, and found that in all there was a chill, and that in fifty there were certain signs of illness before the chill, so that in certain cases you may have some feelings of uneasiness, called by the French generally, malaise, a feeling of sickness coming on before it becomes well marked. The chill varies in length, is commonly pretty sharp, and the temperature is already elevated, although the patient feels cold. The thermometer will indicate that his temperature is rising. This chill is usually followed by a pain in the side. and a general febrile movement. The pain in the side is developed in all cases where the pneumonia begins upon the surface of the lung. In certain instances, however, the inflammation begins centrally in the lung; that is at a distance from the chest wall, and gradually works outward and comes to the surface at a later day. Then there will be no pain at first. The pain is the result of the pleuritic affection that is associated with the pneumonia. The lung itself does not seem susceptible of pain in any great degree. The febrile movement rises pretty rapidly. It is common to find about as high a temperature as you would expect in the course of the disease at the end of twenty-four hours from the beginning of the chill. The temperature rises to 104°, 105°, 106°, or even to 107° sometimes. 106° is about as high as it will ordinarily rise. The febrile movement is attended by an exacerbation in the evening and a remission in the morning, a difference of between one or one-and-a-half degrees. This is one of the features of typhoid and also of typhus fever—an afternoon increase of temperature, a morning remission. Not that this affection is in any intimate way allied with typhus or typhoid fever, but there is a coincidence with reference to the period of the greatest heat.

The pulse is increased in frequency, as you would naturally expect with the increase of heat. It is not a disease, however, attended by a remarkable rapid pulse, except in the fatal cases, and then rapidity is toward the end. One hundred to 115 is about as high as you would expect to find it in an ordinary case.

The tongue does not become dry early, but in the severe cases, and particularly those that have a typhoid type, it does become dry, remaining so a considerable portion of the day, and often more moist in the morning.

The position of the patient is almost always upon his back.

There is something marked in the expectoratien—indeed, characteristic in many cases. It is not very abundant. It seems to be just the overflow of the effusion into the air cells, and its characteristics will be these: First, it is viscid; it adheres to the cup into which it is discharged; one sputum adheres to another, making a pretty uniform mass in the vessel. It is semi-transparent, as a rule; you can see the bottom of the vessel through a moderately thin layer of it. Some little air bubbles are imprisoned in its substance. But the most characteristic thing is the color. This is not absolutely uniform, but perhaps the most common is some tint of yellow, suggesting to you that perhaps the patient has been eating orange peel; some hue of yellow up to some hue of red, and on to a prune juice color. Sometimes it is compared in color to brick dust; it looks as if some brick dust might have been mingled with it, but not to absolutely obscure its translucency.

These are the characters, then, of the characteristic expectoration of pneumonia, and when you find it you may be pretty sure that your diagnosis is correct. The characteristic expectoration occurs in a great majority of cases of pneumonia, but in certain instances in which pneumonia is complicated with bronchitis, there may be a pretty abundant secretion from the bronchial tubes, and the pneumonic expectoration be lost, be buried in that of the bronchitis.

Then again, the condition of the urine in pneumonia, is a matter of some importance. When it is severe you may pretty confidently expect that the urine will contain albumen; and probably casts. Then, again, it will lack one of the salts that habitually appears in it, namely, the chloride of sodium or common salt, but that salt will appear in the expectoration, whether it is that the expectoration draws it off and exhausts it, or whether there is something in pneumonia itself affecting the kidneys that prevents the elimnation of it there, I do not know.

Again a person who is severely sick with pneumonia may become delirious, and I refer to that because at one time in my professional life, rather early, I had met with a considerable number of fatal cases in which delirium was developed in the last day or two, and I had come to look upon it as a fatal symptom. I do not now think of it so gravely. It is a sign of imperfect aeration of the blood, and uræmia, which have deranged the action of the nerve centers, and that is all, but that implies danger.

There is another source of danger. When one lung is so obstructed that the blood circulates with difficulty through it, it is not uncommon that the other becomes overcharged with blood, and there is danger, therefore, from the lung that you call the well one. The obstruction to the circulation through the right lung, for example, will cause a large current of blood to flow to the left, and this not unfrequently is attended by œdema of that lung, and, of course, this increases the danger to your patient.

A word in relation to "typhoid pneumonia." You hear a good deal said about it. It does not mean a special kind of pneumonia. The lesions of typhoid pneumonia are exactly those of the pneumonia that I have described to you. It is simply that in certain instances typhoid symptoms predominate; those symptoms that are observed in typhoid and typhus fever, that is, there comes a dry tongue, there may be sordes upon the teeth, there may be a rapid and small pulse, and a low delirium. When many of the symptoms of typhoid fever come to be united in pneumonia it is rather the fashion to call that particular case a case of typhoid pneumonia. It is regarded as a graver disease than common pneumonia, but bear in mind that it is common pneumonia with the typhoid developments—not typhoid fever engrafted upon it, but merely there are some of the symptoms that are observed in typhoid fever.

Some time ago I gave you an account of fibrinous bronchitis. It is not an uncommon thing that a fibrous bronchitis complicates pneumonia. You will frequently, on cutting into the lung—that is the seat of this disease—draw out from the bronchial tubes little threads looking like grayish-white worms. They are always, I believe, casts of the bronchial tubes, coming from a bronchitis which has complicated the pneumonia. And here I may say that a severe bronchitis with a pneumonia makes the disease a great deal more dangerous. I made some investigations into this matter a few years ago. I applied to the registrar of the board of health for information in regard to the prevalence of the united diseases, and he sent me a page of statistics that confirmed my idea, that when pneumonia and bronchitis occur together, and the latter is severe, the case is much more dangerous than when pneumonia occurs by itself.

The progress of this disease is such that you may expect no additional inflammation after the completion of the fifth day. It is true that in some instances by involving new portions of the lung, the disease may advance after that time, but generally the end of the fifth day limits its progress in the structure of the lung, and you have remaining the consequence of what has occurred. It is not uncommon to find some subsidence of the pulse on the sixth day, but often not until the ninth. In feeble and in aged persons it sometimes happens that pneumonia does not notice the ninth day for the beginning of its resolution. It may continue for four weeks, giving the physical signs, the patient remaining pretty sick, and still he may recover. But if it does not resolve at that time, there is reason to fear that it may be converted into one of the forms of phthisis, pneumonic phthisis or inflammatory phthisis, as it is sometimes called. The lung being infiltrated with the products of the inflammation, breaks down—not the plugs alone, but the structure of the lung also, and forms cavities, and these will go on to the destruction of that portion of the lung that has become so infiltrated, and probably to the destruction of the life of the patient. This we used to call an infiltration of tuberculous matter, but I think we were in error. It seems to be unresolved pneumonia. With, then, this history, it is pretty easy to recognize pneumonia, either early or late, and commonly it can be recognized at once.

It affects persons differently at different times of life. Like bronchitis, it is very grave in infancy, and again in advanced age. For example, in 1878 the number of deaths in New York from pneumonia was 2,288, in a general mortality of 27,000, so that about one in fourteen of all the deaths was caused by pneumonia. Of these, under one year, there were 590; between one and two years, 379; between two and three years, 138; between three and four years, 80; between four and five, 47. Observe how strong the contrast between the first year of life and the four following years—590 in the first year, 47 in the fifth. Then coming to a more advanced age, from five years to ten, there were 74; from ten to twenty there were 41. From ten to twenty, then, pneumonia is of rare occurrence. From twenty to thirty the deaths were 116; from thirty to forty, 161; (observe it is increasing); from forty to fifty, 178; from fifty to sixty it falls off just six, 172; from sixty to seventy, 153; over seventy years, 159. Death from pneumonia occurs a little oftener in males than in females. Of the 2,288 deaths in New York last year, 1,204 were males, and 1,084 in females. Considering the number of persons alive after seventy, and that the mortality of that class is 159, it makes pneumonia a severe disease in old age, and, as you have noticed, a very severe one in the first year of life, 590 deaths.

In regard to the causes of pneumonia, we say in general that cold produces it, and that is about all we know. Why cold, affecting a hundred persons in the same way, should produce pneumonia in only one of them, is a problem that has not yet been solved. But the relation to the season of the year is somewhat understood. Of the number of deaths in this city, caused by pneumonia, in 1876, the greatest number occurred in March, the least number in August. The deaths from this disease during the several months of that year were as follows: For January, 255; for February, 321; for March, 370; for April, 282; for May, 241; for June, 149—(almost a hundred less than the previous month;)—for July, 114; for August, 105; (now the number begins to increase,) for September, 118; for October, 156; for November, 195; for December, 236.

There is, undoubtedly, then, some relation of the weather, some relation of the cold season, to the production of pneumonia. It does not abate, however, in the summer season, but diminishes to less than one-third the maximum mortality.

In regard to the appearance of the lung, you will get a tolerably good idea of the color and appearance of gray hepatization from the figure which I show you. Occasionally the transition from the red to the gray hepatization can be marked, and Cruveilhier has here given the precise moment when this can be best represented, but without knowing its significance.

With reference to the treatment of pneumonia, it will vary of course with the general condition of the patient. If it occurs in the course of other diseases it probably will not admit of much treatment, but occurring by itself, alone, it does seem to yield in a certain degree to what we can do for it. I have not, myself, lost a fondness for the lancet in pneumonia. It is very unfashionable to talk of lancets. A few years ago I received a patient in Bellevue Hospital, a young woman, who had been entirely healthy before this pneumonia had set in. After inquiring into her habits, and learning that she did not drink, that she was of "steady habits," I told the house physician he might bleed her. He said he could not, for he hadn't a lancet, and from among the fifteen or twenty doctors present not a lancet could be borrowed. I then sent him to the surgical case to get one, that being the only way to get a lancet for this particular occasion. We bled her about twelve ounces, and she did very well. In bleeding I have been much accustomed to use cups after scarification, taking three, four, or five ounces from the affected side. I do not suppose it makes much difference whether you bleed from the affected side or from some other part, but it is the fashion so to take it in the hope that it may do more good. It was the fashion when I entered the profession to ptyalize, as soon as possible, in the idea that that condition of the system diminished the plasticity of the blood, and led the patient to an easier recovery. The practice and the reason for it have both been abandoned. We do not hear of anybody giving calomel now with a view of producing ptyalism in pneumonia. In Laennec's time the treatment that he was most attached to was the administration of tartar emetic in such quantities as to reduce the force and frequency of the pulse. He began giving it with the intention of producing a tolerance of the drug, gradually increasing the dose until he often reached six grains, and it would be retained in the system without producing vomiting. He announced everywhere that that treatment was more successful than any that he had ever tried. But it was found from examining his books after his death, that he had not had any greater success after adopting this plan than he had had before. Like the late Dr.——of Philadelphia, he forgot the unfavorable cases, and remembered the favorable ones. The tartar emetic treatment I believe has been mostly abondoned. Of late years it has become the fashion to do but little for pneumonia, as such, but to treat the symptoms. For example, when the temperature rises to 105°, and especially if it rises to 106°, to give some medicine that will reduce it, or to make some application that will produce the same result. For my own part I am satisfied that the safest thing is quinine. Ten grains to an adult three times a day will almost always bring the temperature down several degrees when it is up to 106°. It must be given in full doses, however. The application of cold to the surface of the body is, in some instances, I am satisfied, disastrous. For example, when I entered upon my hospital service, on a certain day in the spring, I found six cases of pneumonia in my department under treatment by the application of ice to the chest. I had read of that treatment among the Germans, and I confessed to a little interest to know what it would do. I allowed the treatment to be continued, and four of those six men died. I have not since allowed any ice to be applied to the chest of a patient of mine who had pneumonia. Sponging with cold water is admissible, and a bath at a temperature twenty degrees below that of the body is admissible. At the same time quinine seems to have about all the power of the bath, or other external applications, and I am rather attached to it. It will, with a good deal of certainty, reduce the temperature, but it will not cut short the pneumonia. It will not modify materially the progress of the inflammation, but as the fever is exhausting, if you can reduce that you have gained a point, and you have increased the chances of your patient's recovery. Understand that the pneumonia will run right on its natural course, undergo its natural resolution, if the patient gets well, unaffected by the quinine. Veratrum viride will reduce the temperature of the body. The objection to it is, that when given with any freedom it is very apt to lead to collapse. I have never seen that collapse fatal, but have met it frequently enough to be afraid of it. Aconite has somewhat the same power, less energetic than the veratrum viride, and therefore safer, and it is the habit among physicians to give the tincture pretty freely with a view of reducing the frequency of the pulse and the heat of the body. In one particular case of pneumonia the use of calomel was well exhibited. During the life of the late Dr. Cammann, a gentleman boarding in one of the down town hotels had pneumonia, and the physician called me to assist him in the treatment. We called on him for two or three days, and it seemed that he must die. His friends asked that Dr. Cammann be added to the consultation; he came, and proposed the administration of large doses of calomel. Three doses of a drachm each were given in the course of a day, and three or four doses from a scruple afterwards, and the man recovered of his pneumonia, but lost every tooth in his head. But the dentist supplied him with new ones, and he thought life was worth having even with false teeth. I do not believe he would have recovered but for that calomel, and yet calomel given in this manner has not become a favorite treatment of pneumonia with me, on account of its disastrous effects on the teeth.

Pneumonia is somewhat more likely to occur in a person who has had it than in a person who has not. I do not know whether it is because of a constitutional liability, or whether it is that once having it renders a person more susceptible to it in some unknown way. It is not very often, however, that a person having once had pneumonia has it again; only often enough to enable us to say that the liability is somewhat greater in those than in others.

An interesting fact that I have already stated is, that after a patient recovers from pneumonia there are no lesions, no effects left. The vessels are fully restored to their function, the air cells are repaved with epithelium, and the lung performs its office as well as it did before. It is true that the pleurisy may cause adhesion of the lung to the chest wall, and produce some contraction of the chest. There is a form of pneumonia that deserves to be spoken of apart, and particularly because it lacks the alarm bell that is rung at the beginning of an ordinary form of the disease, namely, the chill. For example, a man has an operation for the removal of stone performed upon him, and after the operation for two, three, or four days, during which time he has been doing pretty well, he begins to grow worse; he has a little cough; he has perhaps a little pain in the side; his respiration becomes more frequent, but, as is the case in open pneumonia, it is not difficult; no dyspnœa, but the breathing is frequent and shallow. Perhaps you may detect some of the characteristic expectoration. He has a pneumonia which he would not have had if the operation had not been performed upon him, and this kind of pneumonia is to be regarded as one of the risks attending surgical operations, a secondary pneumonia. I say the patient has no chill; he has, perhaps, pain in the side, and perhaps not; he has the characteristic expectoration. You listen to his chest and find the breathing of pneumonia; you find the crepitant rales, and dulness on percussion, and it is altogether likely, do what you will for such a person, he will die. Now there is no chance for taking blood by cups or leeches, but you have to sustain your patient by tonics, and perhaps by alcoholic stimulants from the beginning, carrying him through if you can.

Regarding the alcoholics in the treatment of common pneumonia, I think they are utterly useless. If a man has obstruction to the breathing organs to such an extent that it threatens to destroy him, the alcohols will not cause a removal of it, and though he may breathe a few times more on taking them it will not amount to enough to enable him to recover. You will be tempted to give alcohol in all cases of pneumonia, but you will come to this conclusion if you have an experience similar to mine.

There is another form of pneumonia that I must refer to. It is sometimes denominated broncho-pneumonia. It is a little characteristic. It affects certain lobules of a lung; it occurs in spots; it does not run over the whole lung and become general, but here and there a little group of lobules becomes the seat of inflammation, then another group, and another, until there may be sixty or a hundred of them in one lung. They are generally superficial, or most noticeable, at any rate, upon the surface. There will be a spot of red surrounded by the natural gray color of the lung. A spot from little more than a point up to the size of the end of my little finger, or it may be even larger than that. This a regular pneumonia, but confined to spots. At Bellevue Hospital the other day, some of you had an opportunity of seeing a specimen of that kind of pneumonia—little islands of inflammation surrounded by comparatively healthy lung.

I shall have occasion to say something about chronic pneumonia in the course of the hour, and I will not wait for the subject to come in before I show you some specimens of lung that have undergone the changes of that disease. (The plate of sections was then passed around among the students.) On another plate are a few injections made by the late Dr. Cammann, showing that the circulation in the lungs is not a very open communication, but that when a vessel is located near the periphery of the lung, and the injection made into it, that it goes to a limited portion of lung; that the vessels divide, to be sure, but each particular vessel divides to supply only a given set of lobules, or perhaps even one single lobule. There is no anastomosis between the different lobules of the lung. A lobule is made by an aggregation of air cells, each lobule having its air tube and its vessel, and the vessel ramifies upon each particular air cell so as to make a complete net-work of capillaries on the outside of its walls. The size of the lobules you can get an idea of by a reference to this figure. This, then, will show you the limitation of injections thrown into the smaller vessels. Each lobule is, as it were, a single, minute lung, having no communication with other lobules, except through the vessels that are behind, toward the heart.

I now call your attention to broncho-pneumonia. I had begun to speak of it in my last lecture. It is a form of disease that occurs almost exclusively in young persons. To be sure we saw a specimen of it the other day at the hospital that was in a person 40 years of age who had been reduced by previous disease; the liver had been long affected; she was in the habit of drinking, and in general was badly broken up, and she took pneumonia. It was partly of the character of general pneumonia, and partly lobular. You remember the little spots of inflammation surrounded by healthy lung. That is substantially a lobular inflammation. Lobular inflammation occurs always with catarrh, and not unfrequently with suffocating catarrh, and it is difficult, indeed almost impossible, to assure yourself whether lobular pneumonia exists or not in that condition. This lung which I now show you represents the appearance of lobular pneumonia. You will observe spots of inflammation scattered through both lungs, these spots surrounded by healthy lung. They always occur with capillary bronchitis. I do not mean to say that capillary bronchitis cannot exist without lobular pneumonia, but that it will not exist without the previous existence of capillary bronchitis or suffocating catarrh. Each of these little points of inflammation goes through the same changes that the lobes of the lung do in general pneumonia. There is a congestion, there is a consolidation of these little points, then there is a red hepatization, a gray hepatization and a resolution if the patient gets well. You may find it in the gray stage; I have frequently. You may find it a little difficult to distinguish its color from that of the lung, but there will be a hardness as you pass your finger over it which marks the extent of the inflammation, and there will be a little elevation of it.

The diagnosis of this lobular inflammation, as I said, is almost impossible. It is true that the temperature of capillary bronchitis does not often exceed 102°, while the temperature of lobular pneumonia may go up to 105°. Then, if a child suffering from capillary bronchitis begins to suffer pain in the chest, and if by its movements it increases that pain, that is a reason for supposing that lobular pneumonia may have become a complication with the capillary bronchitis. Expectoration in children that are mostly liable to capulary bronchitis with lobular pneumonia, you rarely see. It is brought into the mouth and swallowed. It is altogether likely, if it could be examined, that it would indicate pneumonia by some strips of colored material.

It is, then, chiefly by the temperature and evidences of pain, that you infer the existence of lobular pneumonia.

As to the treatment of this form of disease, it does not materially differ from the treatment of capillary bronchitis. The warm bath, the oil-silked jacket, those medicines that will aid perspiration, are the best. A pretty free perspiration is the most curative thing that you can apply in both these diseases.

Very similar in appearance to this, is a condition of the lung that has been called atalectasis. It has an appearance exactly resembling that shown in the plate which you are now examining, that of lobular pneumonia in the red stage. One lobule or several lobules associated, will return sometimes to a condition of the lung in the fœtus. You know the lung is all consolidated in the fœtal state, and the act of crying, which every human being that survives, attempts, implies a forced inspiration to open the lungs. That is, the forced inspiration is a part of it, and that opens the lungs for the admission of air. In feeble children, it not infrequently happens that the lung is not fully opened; there remain spots that are still in a state of condensation, or atalectasis. Then, again, in children that are feeble, a little disease (?) occurring within a month perhaps after birth, will so reduce the force of the respiratory muscles that the elastic element of the lung will bring it back into the fœtal state—not the whole of it, but a part; here and there a spot, sometimes a quarter of a lung? This condition is not distinguishable by its color from lobular pnemonia in a state of red hepatization. It is distinguishable, however, by certain appliances which you can make. For example, you pass your finger over a questionable red spot: you will find that it falls away a little from the even surface. Then, again, if you inflate the lung, you can fill out this red spot, which you can not do if it is the result of inflammatory action. You may produce a rupture of the air cells, or of the intralobular passages, and infiltrate the surrounding tissue with air; but you cannot inflate an air cell that is filled with the products of inflammation. In inflammation during life the temperature will be higher than in a child that is suffering from atalectasis, but we know very little about atalectasis as an ante-mortem affection; we know it chiefly by its appearance after death, resembling then very strikingly in shape and color lobular pneumonia, but differing from it in the particulars that I have named.

It has been said sometimes that gangrene attends a pneumonia, as a consequence. This, I think, is a mistake. There is such a thing as gangrene of the lungs, a condition in which a part of the lung dies and is removed by expectoration, or the patient sinks under the effort. Now, this is I believe wholly unconnected with pneumonia; is an affection preceding it, the pneumonia attends it. Gangrene of the lungs always occurs in consequence of an obstruction of one or more of the arteries of the lung. It may be by disease of the artery; it may be by embolism. An obstruction, and pretty complete obstruction of a considerable branch running to divide for the lobules, as I have already described, is an affection preceding gangrene, causing the lung, or a portion of the lung, to be deprived of blood. As there is no anastomosis between the vessel which supplies a particular part of it with blood and those in the neighborhood it cannot receive blood from any other source. Obstruction of an artery, according to its size, will cause destruction of the lung more or less extensive. The process is that of starvation; the supply of blood is cut off by an obstructed vessel, and the portion of lung that should have been supplied with blood by this artery, must die if the obstruction is of long duration. I investigated this subject with the late Dr. Sweet, and we agreed in the opinion here expressed. As this is as good a place as any to give a description of gangrene of the lung, I will give it now. You know nothing of the destruction of the artery that has led to gangrene. That goes on silently, and gives no particular symptom. But at length a person who is suffering in this way begins to feel uneasy, uncomfortable, ill, and he perhaps yields to the defect in the circulation before there is any decomposition of lung tissue, but that follows quickly and then he begins to have a fetid breath, the fetor being that of decomposing animal matter. This becomes worse, and at length he has some expectoration of a greenish material, more or less shreddy, in small fragments at first, but growing more and more shreddy and abundant as the disease advances. He has now a fever; the temperature may be very considerably elevated. He is quite prostrated, keeps his bed or sits in his chair for a portion of the day. This fetor of the breath you do not always perceive except when the patient coughs, but in coughing he fills the air with a most offensive odor. This process of decomposition, or rather of destruction, goes on until all that portion of the lung that was supplied from the obstructed artery has undergone gangrene and has sloughed out. Then, if the patient has strength to endure it, there may be a reparative effort. Indeed, this begins before all the gangrenous portion has been removed. One part of the denuded surface of the lung may be clear of gangrene, and that will begin to get gray instead of a dirty green, and there will form upon it a new membrane, which is partly protective and partly pyogenic, for it has both offices, and as the dead portion of lung sloughs off from point to point this new membrane will follow upon the denuded surface, and so it may go on until a large cavity is made and lined. The majority of persons who suffer from gangrene of the lung do not live for the formation of this cavity and clearing out of the dead matter; they sink from the depressing influences of the dead tissues within them. A few do recover, and the first mark of reparative action will be a sputum that contains purulent matter, a dirty green shreddy material, which is the broken down debris of the lung still continuing.

There is in this period of healing always great danger that the patient may die of hæmorrhage. As this dead matter peels off, it may leave a vessel weak or even open. A good rule with reference to that point is, when persons are getting well, when they are showing an improved expectoration, to require them to be perfectly still; not to move any more than is necessary to get their food and their breath. In disobedience to this rule, a patient in this stage of the disease, at the hospital, some years ago, got up and went to the water closet; he was doing well up to that time, but the effort was sufficient to cause a free hæmorrhage from which he sank. We made a post-mortem examination, and found that a part of the cavity which would have been left after removal of the dead lung, was lined with a pyogenic membrane. The remaining portions still had the dead lung attached to it, and it was at the border where the dead lung was being removed that the vessel was opened. As I said before, much the greater number of those who have gangrene of the lung die of it. Still, some do recover.

The treatment of gangrene of the lung is altogether sustaining; sustaining food, sustaining medicines. The alcoholics should be used carefully, given only by the pulse. When the pulse is small, frequent and feeble, then the alcoholics may help along a little. Quinine is one of the best remedies that we possess in this serious disease, and it should be given pretty freely, in eight or ten grain doses three times a day. It is a little antiseptic of itself, but its antiseptic properties are probably worth but little in this connection, because they hardly prevent the death of a portion of lung that is deprived of blood.

There is another point connected with this subject which I should not omit, and that is that the gangrenous lung excites inflammation about it. It is not uncommon when you cut into such a lung that you find there had been a pneumonia which seems to have been excited by the dead lung. There will be little pools of pus scattered through it, multiple abscess; not unfrequently it completely surrounds the dead portion. That I suppose has led to the conclusion that pneumonia ends in gangrene, I believe it never does. Gangrene may occur with pneumonia; it may occur in anybody in whose pulmonary arteries there is an obstruction which interferes with the flow of the blood.

I think, from the light we have upon the subject now, that simple pneumonia never ends in purulent collections in the lungs. Still there are purulent collections in the lungs, sometimes. But I believe they depend wholly upon an inflammatory action going on in some other part of the body, or rather, I should say upon a septicæmic action. If a part of the body is undergoing gangrene, even if it has no more of a gangrenous appearance than the molecular decay which occurs in ulcers, there may be a disordered action which will result in septicæmia and in the collection of purulent matter in the lung. The name most commonly given to such collections of pus in the lung is multiple abscess. Multiple abscess occurs in other organs besides the lungs, and perhaps in the liver more frequently than in any other. For example, the late Dr. Watts came and talked with me about a patient of his, a gentleman who had scarlet fever, and had it badly. In the course of the fever he had a very bad inflammation of the glands outside the tonsils. Two or three days after the Dr. came to me and said his patient had chills. I said some considerable organ of the body has been poisoned from this inflammatory action in the glands. It turned out to be the liver, which was occupied by a large number of little abscesses, too numerous to count. One or two would be measured by inches. In a similar way where septic action is taking place in any part of the body, other organs than the liver may become the seat of these abscesses. Dysentery is rather the most common cause of this kind of disease of the liver. The purulent deposit of septicæmia is sometimes found in the joints and in some it is found in muscles distant from the part that is primarily affected, but such deposits are always secondary. Here is a lung that has been thus affected. Not only have there been formed the collections of pus, but there is generally pneumonia also. This red portion is pneumonia, the yellow portions are collections of pus. The manner in which these purulent formations are produced is this: An embolus is brought from the affected part and lodges in the vessels of the lung, and beyond the point where this obstruction occurs from the lodgment of the embolus. A kind of inflammatory action occurs, the character of which is derived from the embolus. If that is septic the inflammation of the lung is likely to be septic. The result is a production of pus commonly at numerous points. If you examine one of these points of inflammatory action before it has come to the full formation of pus, you will find that it is very greatly congested, and that the tissues are softened, and if you cut into it you will find a little collection of pus in the centre. In time that little collection of pus would have spread, and would have occupied in the end all the inflamed structure, making a little pool of pus. You may form an idea of the conditions under which these collections occur from a particular case. The first woman who was successfully treated by opium in puerperal peritonitis and metritis, recovered with purulent collections in the lungs. After she was relieved of her puerperal disease she began to cough. She was pale and feeble, her pulse very rapid, and she had something like a hectic fever. She was removed to a ward apart from the lying-in wards, and was treated for a time with the idea that she had phthisis. But, one day, seeing her and observing the expectoration, that it was unusually white for a tuberculous patient, I suggested to Dr. Cock, who was directing her treatment, that she was probably suffering from multiple abscess of the lung, and that the multiple abscess had been derived from her metritis, purulent metritis She finally got well; entirely well, for I saw her two or three years afterward, and she had gained fifty or sixty pounds in weight. These multiple abscesses of the lung may, then, in certain instances be relieved; the patient may recover. In general they do not. The diagnosis can be made mainly by the exclusion of phthisis. The expectoration is freer than it commonly is in phthisis, and the purulent matter that is discharged of a considerably lighter color. Tubercles are most apt to be developed first under the clavicles, but multiple abscess is diffused through the lung. They may be under the clavicle, but they are just as likely, indeed more likely, to be in all other parts of the lung. A person who has had septicæmia and has free expectoration is very likely to have it produced by these multiple abscesses of the lung.

As to the treatment, it is, of course, sustaining all the way through; sustaining as far as diet goes, sustaining in regard to medicine, and as there is certain to be a hectic fever, quinine comes to be of the greatest service.

There is another form of disease of the lungs that I must call your attention to, and that is chronic pneumonia. It has no connection with the acute pneumonia that I have described. It affects another portion of the lung structures. The acute pneumonia, I told you, is an inflammation of the lining membrane of the air cells and alveolar passages; but a chronic pneumonia is an inflammation of the intercellular tissue, of the connective tissue that lies between and outside the cells. The connective tissue, in other words, of the lungs undergoes a change which I will try to describe to you. The changes are slow. The tendency is to contraction of the lung, a diminution of its size and a hardening of its tissue and a change of its color to a bluish hue. This change goes on in the same manner as in the liver when it becomes contracted in cirrhosis, a similar disease. This change in the lung has, therefore, sometimes been called cirrhosis of the lung. It is a bad name. The word cirrhosis is derived from the color which the liver takes on, yellow. The lung does not become yellow, but grayish blue. It may do for the sake of comparison to call it cirrhosis of the lung, but a much better name is that which I have used, chronic pneumonia. The term chronic pneumonia has been applied to unresolved pneumonia, cheesy pneumonia, but I do not think it a good use of the term. The lung, you understand, becomes small and of a bluish hue, and of a firm consistence, and all through there is a production, an increase, rather slowly, of fibrous elements in the inter-vascular structure. Persons who have a tendency to phthisis are more liable to this inflammation than others, and yet it may occur in other persons. In the progress of this disease, the lung contracting, the ribs follow it; the chest is diminished in size. This occurs only on one side. The ribs will follow the lungs as far as they can, but then the lungs contract still more, there will be an effusion of serum into the chest. It is not the result of inflammation; the pleuritic covering of the lung is hardly involved in this disease. It is an effusion of serum to fill a vacuum. You understand that "nature abhors a vacuum," and particularly so in the body of man, and to prevent it, therefore, the serous fluid of the blood is drawn out of the vessles to fill the space left by the contracting lung.

The duration of this disease is months. I have known a case terminate in three months; I have known cases continue nine months and more.

The indications of the disease are pretty clear after it is well established. For example, there is a cough from the beginning, and an expectoration of a muco-purulent matter; each particular sputum when thrown into water takes a rounded shape, and does not unite with another. It is opaque and not very abundant as a rule. A chronic cough will naturally lead you to inquire if there is not tuberculosis. You should examine the lungs under both clavicles, to ascertain whether there are not signs of tubercle. You will possibly find that there are none. However this may be, the signs of chronic pneumonia will be just as marked in the inferior and posterior portion of the lungs as at the apex, always affecting only one side. But the marked point is reached when the serous effusion occurs. The lung contracting will give you a certain degree of dulness; then when it contracts to a degree that cannot be compensated for by the retracting ribs, will come this serous effusion, and as the patient sits in his chair, or stands, the serum will always be below the lung. You get the physical signs of pleurisy with serous effusion, but you have not the other symptoms of pleurisy, you have not the pain. When that effusion occurs in a person who has been ill for two or three months, if there has been a gradually growing bronchophony and bronchial respiration, and a gradually growing dulness on percussion, you can not well mistake the disease. If you cannot make your diagnosis previous to the effusion of the serum, you certainly can then. It is not a common disease. I have met perhaps with a dozen cases in my life time, and in most cases recovery has taken place, requiring, as I intimated, nearly a year in many cases to run its course.

The treatment, again, is sustaining in as high a degree as you can well apply to the case. Counter irritation I have always used, whether with benefit or not I can hardly say. Upon the affected side of the chest make an application of the tincture of iodine. This has been rather my favorite. Paint over the chest on a space as big as your hand with the tincture of iodine, until it becomes painful. Then take another space of about the same extent next it, and then another and so on, painting each particular spot twice a day, for about three days, when it will probably become sufficiently irritated. The patient should be encouraged to eat all the food he can digest, and in this way he may find his strength pretty well sustained. The medicines that give strength, the tonics, are those that you rely on chiefly. Unless the patient has tubercles there is a pretty good chance for his recovery.—ALONZO CLARK.

PNEUMO-PERICARDIUM.—Gas is occasionally found in the pericardium, either having entered from without, or resulting from decomposition of fluid in its cavity. It might give rise to tympanitic resonance over the cardiac region, and to succussion-splash, if mixed with fluid.—FREDERICK T. ROBERTS.

PNEUMO-THORAX—*See Pleurisy*

PODAGRA, Acute—*See Acute Gout.*

PODAGRA, Chronic—*See Chronic Gout.*

POISONING, What to do in cases of.—The Antidote Bag.—The antidote bag should contain every drug and instrument likely to be required in a case of poisoning. It should be to the Toxicologist what the midwifery bag is to the Obstetrician. It should always be kept filled and ready for use, so that in case of emergency the doctor would simply have to take or send for his bag, and would not have to look for stray bottles or instruments at a time when every moment is of importance.

The antidote bag should contain:

I. *Instruments.*—1. Stomach-pump, which might also be used as an enema apparatus. There should be a small Œsophagus tube for children. 2. Hypodermic syringe. 3. Flexible catheter, No. 8.

II. *Emetics.*—1. Sulphate of zinc in half-drachm powders; one or two to be given as an emetic. 2. Powdered ipecacuanha in ℈j powders; one or two to be given in water as an emetic. 3. Apomorphia (1 in 50 solution in water) ʒ ij.

III. *Stimulants.*—1. Brandy, ℥ iv. 2. Sal volatile, ℥ iv. 3. Chloric ether, ℥ iv. 4. Coffee in ¼ lb. tin; to be used as an enema in poisoning by opium or other narcotics.

IV.—*Antidotes.*—1. Dialyzed iron, ℥ xvj; should be given *ad libitum* in cases of arsenic poisoning. Wyeth's is a good preparation. 2. Acetic acid, ℥ iv; two teaspoonfuls or more in water in cases of poisoning by potash, soda, etc. To be frequently repeated. 3. Syrup of chloral, ℥ iv; of great value in strychnia poisoning. Three drachms (= 30 grains of chloral) may be given to begin with. 4. French oil of turpentine, ℥ ij; as an antidote in phosphorus poisoning. To be given in half-drachm doses every quarter of an hour. 5. Calcined magnesia; may be given almost *ad libitum* in poisoning by acids. 6. Tannic acid, ℥ ij; in strychnia poisoning may be given in teaspoonful doses. 7. Bromide of potassium in ʒ ij powders; in strychnia poisoning may give two powders to begin with and follow with one every ten minutes for an hour or so. 8. Nitrite of amyl capsules, 5 minims in each. Useful in chloroform poisoning, and in poisoning by aconitia. 9. Chloroform, ℥ iv; in strychnia poisoning.

V. *Hypodermic Injections.*—1. Sulphate of atropia solution 1 in 120 B.P., ʒ j; in poisoning by aconite, morphia, pilocarpine, etc. The ordinary dose for hypodermic use would be three minims, repeated in a quarter of an hour if necessary. 2. Acetate of morphia solution 1 to 12, B.P., ʒ j; useful to ward off shock. Ordinary dose for hypodermic use four minims. 3. Aconitia solution (1 in 240) ʒ j; in oisoning by digitalis. Two minims hypodermically; may be repeated in half an hour. 4. Pilocarpine nitrate (1 in 20) ʒ j; given in ten minim doses in atropia poisoning. 5. Nitrate of strychnia solution (1 in 50) ʒ j; in chloral poisoning given in minim doses. 6. Tincture of digitalis, ʒ j; in aconite poisoning in 20 minim doses hypodermically.

It is a good plan to inspect the bag at intervals to see that every thing is in working order. The piston of the hypodermic syringe always works badly if not looked after.

A battery (interrupted current) is useful, and may be obtained for about £2 2s. I have tried Maw's and also Dr. Spamer's and like them very much. In poisoning by ammonia, tracheotomy instruments might be required. In cases of prolonged insensibility the bladder should be emptied.

The Stomach-Pump.—Every doctor should have a stomach-pump, or an efficient substitute. It may not be wanted for years, but it may be wanted to-morrow, and a life, or many lives, may depend on its being in working order. A good stomach-pump with flute-key action and everything complete may be obtained for £2 or even less, and it requires no *special knowledge to use it.* The only points to remember are that it is advisable to pump in a little water before trying so empty the stomach, and that the stomach should not only be emptied but thoroughly washed out. Antidotes may be conveniently introduced in this way. In cases of poisoning with the mineral acids—nitric, hydrochloric and sulphuric acids for example—it is not safe to use it. Fortunately, in case of emergency it is no very difficult matter to rig up an apparatus that will effectually empty and wash out the stomach without a stomach-pump. Take a piece of India-rubber tubing, about six feet long, and pass it down the œsophagus till it reaches the stomach, now hold the other end well above the head, and by means of a funnel pour in water till the stomach is nearly full. If now the tube be pinched whilst distended with water and the lower end placed in a basin below the level of the stomach, it will act as a syphon and the stomach will be emptied. This may be repeated three or four times till the water comes back quite clear and free from smell. In the absence of a funnel a common India-rubber bottle may be used to fill the tube, or, for the matter of that, even the mouth filled with water. A common Higginson's enema apparatus will do very well to inject the water, and if it has no valves; or if they do not work—not an uncommon occurrence —it will help to form part of the syphon. Those who are interested in the subject will do well to read a capital little paper by Professor Harvey, of Aberdeen, in the *British Medical Journal* for October 16th, 1875.

EMETICS.—The emetics commonly employed are the following:

1. *Common Salt.*—Two tablespoonfuls in half a pint of tepid water. Not a very certain emetic but has the advantage of being always at hand.

2. *Mustard (the flour).*—A tablespoonful in half a pint of water. This, too, is readily procured.

3. *Sulphate of Zinc.*—Thirty grains, in water, repeated if necessary; prompt and safe.

4. *Powdered Ipecacuanha.*—Thirty grains or more in water, produces very little depression, and does not irritate the mucous membrane of the stomach.

5. *Ipecacuanha wine.*—Two tablespoonfuls in water; not very prompt in its action.

6. *Apomorphia.*—From gr. $\frac{1}{10}$ to gr. $\frac{1}{4}$ by mouth, or hypodermically. It is a powerful emetic and usually acts promptly, without the production of much nausea or depression. The solution turns green in a day or two, but retains its activity. I recently gave a patient a hypodermic injection of $4\frac{1}{2}$ minims of a 1 in 50 solution of apomorphia which had been kept exposed to the light for three months, and in about three minutes it acted powerfully, completely evacuating the stomach. It may be given freely, for no unpleasant symptoms seem to result from large doses. Although prepared from morphia it differs so completely in its action from that alkaloid that there is no reason why it should not be given in cases of opium poisoning.

7. *Sulphate of Copper.*—From five to ten grains dissolved in water.

8. *Tartar Emetic.*—Three grains in water—slow in action and usually causes much nausea and depression.

9. *Antimony wine.*—An ounce or more in water.

10. *Carbonate of Ammonia.*—Half-a-drachm or more in water.

11. *Powdered Alum.*—A table-spoonful in water. Not very reliable.

In cases of poisoning it is not so much a question as to which is the best emetic as to which can be obtained at once. Many people vomit very readily, almost at will, and with them a draught of tepid water, dirty or greasy by preference, with the introduction of the fingers into the throat will speedily produce the desired result. In many cases it is desirable to give a combined emetic. Thus, we may begin with a tablespoonful of mustard in a tumbler of water, and follow it as quickly as possible with an emetic draught. Sulphate of zinc, 30 gr.; powdered ipecacuanha, 50 gr.; to be taken in water.

This, again, may be followed by a hypodermic injection of gr. $\frac{1}{5}$ of Apomorphia, (10 minims of the 1 in 50 solution).

The action of the emetic is facilitated by giving plenty of tepid water. In narcotic poisoning it is often a most difficult matter to get the patient to vomit.

MULTIPLE ANTIDOTES.—Many attempts have been made to formulate a multiple officinal antidote, to obtain that is a mixture which would neutralize the toxic action of most, or even all the active poisons. Such attempts are hardly likely to prove successful, but the following is probably the best formula for such a preparation:—Saturated solution of sulphate of iron, 100 parts; water, 800 parts; calcined magnesia, 88 parts; purified animal charcoal, 40 parts.

The iron solution is to be kept separately, and the magnesia and animal charcoal mixed in a bottle with water. When required for use the iron solution should be poured into a bottle and the whole shaken well together. It should be administered *ad libitum*, a wine-glassful or more at a time. It is said to render preparations of arsenic, zinc, and digitalis absolutely inert, and partly to neutralize the action of mercury, morphia, and strychnia. It exerts no action, it is said, on the alkalies, and none on phosphorus, antimony or hydrocyanic acid.

Iodide of starch has also been recommended as a multiple antidote.

FATAL DOSE.—It is no easy matter to say positively what is the fatal dose of any particular poison. Much depends on the age of the patient, the condition of the stomach as regards food, the occurrence of copious and early vomiting, the administration of appropriate remedies and so on. In many of the recorded cases the exact quantity taken is not known, whilst in others the strength of the preparation is not given.

Acetic Acid.—1. Soap and water. Large draughts of soap and water to be taken at once. Stomach-pump not be used. 2. Lime-water, chalk and water, or white-wash and water, if at hand. Magnesia may be given freely. Dinneford's fluid magnesia is useful. 3. Milk, oil, and thick gruel may be used. 4. Morphia. A hypocermic injection of half-a-grain of morphia to ward off shock.

Aconite.—1. Stomach-pump or Emetic of mustard (a tablespoonful of the powder in water), or of sulphate of zinc (a scruple in water), or of Ipecacuanha wine (a tablespoonful in water). 2. Stimulants freely, brandy, spirits of chloroform, or sal volatile. If not retained in the stomach, to be well diluted and injected into the rectum. 3. Atropia. Give a hypodermic injection of gr. $\frac{1}{60}$ of atropia (2 minims of the 1 in 120 solution) or if not at hand four drops of solution of sulphate of atropia, or twenty drops of tincture of belladonna by mouth or rectum. Be guided by the pulse, and if it improve, repeat the dose in a quarter of an hour. 4. Warmth. Apply warmth to extremities by hot towels and hot water bottles. Friction with the warm hand. Mustard poultice, or mustard leaf, over the heart. 5. Keep the patient strictly in the recumbent position. 6. Digitalis. If no improvement, give a hypodermic injection of twenty minims of tincture of digitalis, repeating it in twenty minutes if the pulse improve. 7. Nitrite of Amyl. Inhalations of nitrite of amyl. 8. Artificial respiration for two hours if necessary. Fatal dose. Death after taking a drachm of the tincture, also from merely tasting Fleming's tincture. Recovery after taking three drachms of Fleming's tincture. Fleming's tincture is six times as strong as the B. P. solution.

Aconite and Belladonna.—1. Stomach-pump or emetic of mustard (a tablespoonful of the powder in water), or of sulphate of zinc (a scruple in water), or of ipecacuanha wine (a tablespoonful in water). 2. Stimulants freely, brandy, spirits of chloroform, or sal volatile. If not retained, dilute and inject into rectum. 3. Warmth to extremities by hot towels, or hot water bottles. Friction with the warm hand. Mustard leaf or mustard poultice over the heart. 4. Keep the patient in the recumbent position.

Aconite and Morphia.—1. Stomach-pump or emetic of mustard (a tablespoonful or more of the powder in water), or of sulphate of zinc (twenty grains or more in water), or of ipecacuanha wine (an ounce in water). 2. Rousing. Flap patient with a wet towel especially about the chest, and over the region of the heart. Give him ammonia and chloric ether freely. Keep him in the recumbent position, and do not attempt to walk him about. 3. Warmth to the extremities by hot towels, or hot water bottles. Friction with the warm hand. 4. Atropia. A hypodermic injection of gr. $\frac{1}{60}$ of sulphate of atropia (2 minims of the 1 in 120 soulution), or, if not at hand, 4 minims of the solution of sulphate of atropia, or twenty minims of belladonna by mouth or rectum. If pulse improve, may repeat the dose in twenty minutes. 5. Coffee. An enema of a pint of hot strong coffee. 6. Nitrite of amyl. Inhalations of nitrite of amyl. 7. Battery. Interrupted current to extremities. 8. Artificial respiration to be maintained for two hours if necessary.

Alcohol.—1. Stomach-pump or emetic of mustard (a tablespoonful of the powder in water), or of sulphate of zinc (a scruple in water), or of ipecacuanha wine (a tablespoonful in water. 2. If patient insensible rouse him in every way, make him walk about, flap him with wet end of towel, shout at him, pinch him, and apply battery (interrupted current) to legs. 3. Coffee. Give him hot strong coffee by mouth or enema. 4. The cold douche, a jug of water being steadily poured over the head from a height from time to time. The alternate hot and cold douche is very useful. 5. Nitrite of Amyl. Inhalations of ammonia or nitrite of amyl. *Fatal dose.* Death from half a pint of gin. Recovery after a quart of whiskey, also after a pint and a half of mixed gin and brandy.

Almond Flavor.—Also known as Essential Oil of Almonds. The poisonous properties are due to the presence of prussic acid. For treatment see Prussic Acid.

Ammonia.—1. Vinegar freely diluted with water. Lemon or orange juice given freely. Acetic acid or any other acid if diluted with large quantities of water. Toilet vinegar may be used. 2. Demulcent drinks such as white of egg and water, milk, barley-water, arrow-root, etc., olive oil. 3. If much dyspnœa from œdema of the glottis it may be necessary to perform tracheotomy. *Fatal dose.*—Half an ounce of the strong solution usually proves fatal, but recovery is recorded after an ounce had been taken.

Antimony.—1. In those rare cases in which there is not vomiting, give an emetic of mustard (a tablespoonful of the powder in water), sulphate of zinc (a scruple in water), or ipecacuanha wine (an ounce in water). 2. Tannic or gallic acid. Give half a drachm of tannic or gallic acid in water, repeating it as often as rejected. Decoction of oak-bark will do as well. 3. Coffee. Give large doses of strong tea or coffee. 4. Give white of egg, barley-water, arrow-root water, or milk. 5. Stimulants. Give stimulants if much collapse. 6. Wrap the patient in warm blanket, and put hot water bottles to the feet. 7. Morphia. Give a hypodermic injection of gr. ½ of morphia when the acute symptoms have subsided. *Fatal dose.* Much would depend on the occurrence of vomiting. From ten to twenty grains of tartar emetic would probably prove fatal, but recovery is recorded after half an ounce had been taken.

Aqua Fortis.—See Nitric Acid.

Arsenic.—1. Emetics are as a rule not required, but if necessary give a tablespoonful of mustard in water, or a scruple of sulphate of zinc. To be followed by large draughts of hot water and salt, to wash out the stomach. 2. Dialyzed iron. Give freshly prepared sesqui-oxide of iron, made by precipitating tincture of perchloride of iron with carbonate of soda, and filtering through a handkerchief. It should be given in hot water, and in unlimited quantities, or give Dialyzed Iron in ounce-doses repeatedly. 3. Give magnesia in unlimited quantities, if above not at hand. 4. Give castor oil, or even common oil, frequently and in large doses. 5. Stimulants freely, if much prostration. 6. Mucilagious drinks. Such as white of egg, barley-water, linseed tea. 7. Warmth. Hot blankets, hot bottles to extremities, friction with warm hand. 8. Morphia. When the more acute symptoms have subsided, limseed meal poultices to abdomen, and a hypodermic injection of half a grain of morphia. *Fatal dose.*—From two to three grains usually fatal, but recovery probably after one grain. In exceptional cases, recovery after very large doses.

Atropia.—1. Stomach-pump, or emetic of mustard (a tablespoonful of powder in water), or of sulphate of zinc (a scruple in water), or of ipecacuanha wine (a tablespoonful in water). 2. Stimulants such as brandy, sal volatile, or chloric ether. 3. Coffee. An enema of hot strong coffee (a pint). 4. Mustard to the calves of the legs, hot water bottles to the feet, rousing by flicking with a wet towel, alternate. hot and cold douche, interrupted current to limbs, etc. 5. Pilocarpine. Hypodermic injection of half a grain of pilocarpine (10 minims of the 1 in 20 solution), to be repeated frequently if necessary, or two drachms of tincture of jaborandi by mouth or rectum. 6. Artificial respiration to be maintained for at least two hours if necessary. *Fatal dose.*—From 1½ to 2 grains.

Baryta or Barium.—1. Stomach-pump, or emetic of sulphate of zinc (half-a-drachm in water), or of mustard (a tablespoonful of the powder in water), or of ipecacuanha wine (a tablespoonful in water). 2. Sulphate of magnesia (Epsom salts) in ounce doses; sulphate of soda (Glauber's salt), in ounce dose in water or milk, or alum in drachm doses. Dilute sulphuric acid 3½ doses may be added to these draughts, or may be given alone freely diluted with water.

Battle's Vermin Killer.—This is said to contain 23 per cent. of strychnia mixed with sugar, flour, or Prussian blue. For treatment see Strychnia.

Belladonna.—Stomach pump or emetic of mustard (a tablespoonful of the powder in water), or of sulphate of zinc (a scruple in water). or of ipecacuanha wine (a tablespoonful in water.) 2. Stimulants such as brandy, sal volatile or chloric ether. 3. Coffee. An enema of a pint of hot coffee. 4. Mustard to the calves of the legs, hot water bottles to the feet, rousing by flicking with a wet towel, alternate hot and cold douche, inerrupted current to limbs, etc. 5. Pilocarpine. Hypodermic injection of half a grain of pilocarpine (10 minims of the 1 in 20 solution) to be repeated if necessary, or two drachms of tincture of jaborandi by mouth or rectum. 6. Artificial respiration, to be maintained for two hours if necessary. The majority of cases recover.

Belladonna and Aconite.—1. Stomach-pump, or emetic of mustard (a tablespoonful of the powder in water), or of sulphate of zinc (a scruple in water), or of ipecacuanha wine (a tablespoonful in water. 2. Stimulants freely, brandy, spirits of chloroform, and sal volatile. If not retained, dilute and inject into rectum. 3. Warmth to extremities by hot towels, or hot water bottles. Friction with the warm hand. Mustard leaf, or mustard poultice, over the heart. 4. Keep the patient in the recumbent position. 5. Nitrite of amyl. Give inhalations of nitrite of amyl. 6. Artificial respiration to be maintained for two hours if necessary.

Belladonna and Opium.—1. Stomach-pump, or emetic of mustard (a tablespoonful of the powder in water), or of sulphate of zinc (a scruple in water), or of ipecacuanha wine (a tablespoonful in water.) 2. Coffee. An enema of a pint of hot strong coffee. 3. The patient should be kept awake. Flicking with a wet towel, and mustard to the calves of the legs and over the region of the heart, wlll be found useful. 4. Artificial respiration may be resorted to if necessary.

Benzin.—Benzol.—1. Stomach-pump, or emetic of mustard (a tablespoonful in water), or sulphate of zinc (twenty grains in water), or ipecacuanha (a scruple of the powder in water). 2. Stimulants. Such as brandy, liquor ammoniæ, (half a drachm in water), sal volatile (a drachm in water), or chloric ether (half a drachm of water) frequently repeated. If patient cannot swallow, to be given as enema, or brandy may be injected under the skin. Inhalations of ammonia on a pocket handkerchief. 3. Douche. Alternate hot and cold douche, the water being poured over the chest from a height. 4. Atropia. Hypodermic injection of gr. $\frac{1}{60}$ of atropia (2 minims of the B P. solution), or 30 drops of tincture of belladonna, given by mouth in water. 5. Artificial respiration to be maintained till the patient has recovered, or the heart has ceased beating. 6. Battery. Mild interrupted current to chest walls, and over region of the heart.

Bichromate of Potash.—1. Stomach-pump, or emetic of mustard, (a tablespoonful of the powder in water), or of sulphute of zinc (a scruple in water), or of ipecacuanha wine (a tablespoonful in water). 2. Carbonate of magnesia, or chalk in milk, or white of egg in milk or in water. 3. Barley-water, arrow-root, etc.

Bismuth.—Any poisonous effects that may occur are probably due to the presence of arsenic as an impurity. For treatment, see Arsenic.

Bitter Almond Water.—For treatment, see Prussic Acid.

Blue Vitriol, or Blue Stone.—This is sulphate of copper. For treatment, see Copper.

Brucia.—The treatment is the same as for Strychnia.

Burnett's Fluid.—This is a solution of impure chloride of zinc. For treatment, see Zinc.

Butler's Vermin Killer.—Is said to contain about five per cent. of strychnia mixed with flour and soot. For treatment, see Strychnia.

Calabar Bean.—1. Stomach-pump, or emetic of mustard (a tablespoonful of the powder in water), or of sulphate of zinc (a scruple in water), or of ipecacuanha wine (an ounce in water). 2. Atropia. A hypodermic injection of gr. 1-60 of sulphate of atropia (2 minims of the 1 in 120 solution),or fifteen drops of tincture of belladonna, by mouth or rectum. To be repeated every quarter of an hour, or until the pupils dilate or the pulse is quickened. 3. Chloral. Should the above fail, give ten grains of chloral by mouth or rectum every quarter of an hour for an hour. 4. Strychnia. In desperate cases, a hypodermic injection of gr. 1-12 of nitrate of strychnia (4 minims of the 1 in 50 solution), or 20 minims of tincture of nux nomica, by mouth or rectum. 5. Stimulants freely,—brandy, chloric ether, sal volatile. 6. Artificial respiration.

Camphine.—This is oil of turpentine purified by distillation with lime. For treatment, see Turpentine.

Camphor.—1. Stomach-pump, or emetic of mustard (a tablespoonful of the powder in water), or of sulphate of zinc (a scruple in water), or of ipecacuanha wine (a tablespoonful in water. 2. Stimulants freely,—brandy spirits of chloroform, sal volatile, ether, etc. 3. Warmth to the extremities by hot blankets, hot water bottles, etc. Rubbing with the warm hand. 4. Douche. Alternate hot and cold douche to head and chest. Rarely fatal ; recovery after taking two drachms.

Cantharides.—1. Stomach-pump, or emetic of mustard (a tablespoonful of the powder in water) or of sulphate of zinc (a scruple in water), or of ipecacuanha wine (half an ounce or more). 2. Demulcent drinks. Barley-water, or white of egg and water, gruel, linseed tea. 3. Morphia. If much pain, twenty minims of laudanum by mouth, or a third of a grain of morphia hypodermically. 4. Hot baths or linseed-meal poultices to the abdomen, when the more acute symptoms have subsided. *Fatal dose.*—Recovery is recorded after taking an ounce of the tincture.

Carbolic Acid.—1. Stomach-pump or emetic of mustard (a tablespoonful of the powder in water), or of sulphate of zinc (a scruple in water), or of ipecacuanha wine. 2. Wash out the stomach with soda, or with saccharated lime dissolved in large quantities of tepid water, until the smell of the acid is no longer perceived. 3. White of egg in water in large quantities. 4. Give an ounce of castor oil or half a tumblerful of olive oil. 5. Give stimulants freely, hot brandy and water, chloric ether, and sal volatile. 6. Apply warmth to the extremities. Friction with the warm hand. Interrupted current to the extremities. 7. Atropia. Hypodermic injection of gr. $\frac{1}{60}$ of sulphate of atropia (2 minims of the 1 in 120 solution). 8. Inhalations of nitrite of amyl. 9. Bleeding might be resorted to in desperate cases.

Carbonic Acid Gas.—1. Plenty of frssh air, open all doors and windows. 2. Artificial respiration to be kept up steadily and unceasingly. 3. Ammonia to the nostrils. Friction and warmth to the extremities. Interrupted current to the limbs. 4. Stimulants in moderate quantities. Injection of a pint of hot strong coffee into the rectum. 5. The inhalation of oxygen (about two quarts), if obtainable. 6. Cold douche to head and chest. 7. Bleeding might do good. 8. The catheter may have to be used in prolonged cases.

Carbonic Oxide Gas.—The treatment is as above for Carbonic Acid Gas.

Caustic Potash—Caustic Soda.—1. Give large draughts of water mixed with vinegar, acetic acid, citric acid, lemon-juice, or orange juice. 2. Demulcent drinks, such as white of egg (uncooked), and water, milk, gruel, barley-water, etc. 3. Olive oil freely.

Charcoal Fumes.—For treatment, see Carbonic Acid Gas.

Chloral—Chloral Hydrate.—1. Stomach-pump, or emetic of mustard (a tablespoonful of the power in water), or of sulphate of sinc (a scruple in water), or of ipecacuanha wine (an ounce in water). 2. Keep up the temperature by hot blankets, frequently renewed, hot water bottles, hot bricks, dry friction, etc. 3. Prevent patient from sleeping, by rousing him in every way, by speaking to him sharply, flapping face and chest with wet towel, pinching, mustard to calves of legs, battery to limbs, etc. 4. Injection of a pint of hot strong coffee into rectum. 5. In bad cases, hypodermic injection of gr. $\frac{1}{25}$ of nitrate of strychnia (2 minims of a 1 in 50 solution), or fifteen minims of tincture of nux vomica by mouth or rectum. It may be repeated if necessary, and improvement in the pulse and temperature is to be taken as an indication that it is doing good. 6. Inhalations of nitrite of amyl from time to time. 7. Artificial respiration on slightest sign of failure. To be continued for some hours if necessary. *Fatal Dose.*—Death from taking 30 grains, recovery after taking three drachms.

Chloral and Morphia—Chloral and Opium.—1. Stomach-pump, or emetic of mustard (a tablespoonful or more of the powder in water), or of sulphate of zinc (a scruple in water), or of ipecacuanha wine (an ounce in water.) The stomach to be thoroughly washed out. 2. Rouse the patient be flapping him with a wet towel, etc. Ammonia to the nostrils. Cold douche to to the head and chest, followed by warm douche. Patient to be kept warm. 3. Give hot strong coffee, or inject it into the bowel. 4. Give a hypodermic injection of gr. $\frac{1}{40}$ of atropia (3 minims of the 1 in 120 solution), repeating it in a quarter of an hour if necessary. 5. If the symptoms of chloral poisoning predominate, give a hypodermic injection of gr. $\frac{1}{25}$ of nitrate of strychnia (2 minims of 1 in 50 solution), repeating it in half an hour if necessary, or fifteen minims of tincture of nux vomica may be given by mouth or rectum. 6. Artificial respiration to be kept up for some hours.

Chloride of Zinc.--For Treatment, see Zinc.

Chlorine Gas.—1. Plenty of fresh air. 2. Inhalations of steam. 3. Inhalation of chloroform to ease the cough.

Chlorodyne is said to consist of chloroform, muriate of morphia (probably about 2½ grains to the ounce), rectified ether, oil of peppermint, prussic acid, gum acacia and treacle. For treatment see Opium. ***Fatal Dose.***—An ounce has proved fatal.

Chloroform (Inhalation).—1. Pull the tongue well forward and see that the mouth is clear. See that there is no obstruction by artificial teeth. 2. Loosen everything about the chest. Open doors and windows so as to have plenty of fresh air. Alternate cold and warm douche to chest and head. 3. Artificial respiration to be commenced at once—not faster than twenty in the minute. 4. Let the head be at a lower level than the rest of the body. Completely invert the patient for a moment, letting the head rest on the ground. 5. Inhalations of nitrite of amyl. 6. Battery. Interrupted current, one pole at pit of the stomach and the other over the larynx. To be used cautiously, and for a short time only. Strong currents are to be avoided. 7. In apparently hopeless cases two or three violent blows on the chest delivered in quick succession may restore the heart's action.

Chloroform (Swallowed).—1. Stomach-pump or emetic of mustard (a tablespoonful of the powder in water), or of sulphate of zinc (a scruple in water), or of ipecacuanha wine (a tablespoonful in water). 2. Give large draughts of water containing carbonate of soda in solution. 3. Rouse the patient in every way possible. Flicking with wet towel. Mustard to calves of legs. Mustard leaf over heart. 4. Injection of a pint of hot strong coffee into the rectum. 5. Inhalations of nitrite of amyl frequently. 6. Do not leave the patient for some hours after, for there may be a relapse.

Chromic Acid.—1. Stomach-pump or emetic of mustard (a tablespoonful of the powder in water), or of sulphate of zinc (a scruple in water) or of ipecacuanha wine (a tablespoonful in water). 2. Carbonate of magnesia, or chalk in milk, or white of egg in milk, or in water. 3. Demulcent drinks. Barley-water, linseed tea, arrowroot gruel, etc.

Coal Gas.—1. Plenty of fresh air. Open all doors and windows. 2. Artificial respiration to be kept up steadily and incessantly. 3. Ammonia to the nostrils. Friction and warmth to the extremities. Mustard leaf, or mustard poultice to calves of legs. Interrupted current to extremities. Mustard over the heart. 4. Stimulants in moderate quantities by mouth of rectum. Enema of a pint of hot strong coffee. 5. The inhalation of oxygen (four or five quarts) if obtainable. 6. Alternate cold and warm douche to head and chest. 7. Bleeding might do good. 8. In prolonged cases it may be necessary to employ the catheter.

Cocculus Indicus.—See Picrotoxine.

Colchicum.—1. Stomach-pump, or emetic of mustard (a tablespoonful of the powder in water), or of sulphate of zinc (a scruple in water), or of ipecacuanha wine (an ounce in water). 2. Give tannic or gallic acid in half drachm doses, frequently repeated, or strong tea. 3. Demulcent drinks, such as white of egg and water, barley-water, arrowroot, etc. 4. Stimulants, if signs of collapse, brandy, chloric ether, sal volatile. 5. A hypodermic injection of half-a-grain of morphia.

Conium.—1. Stomach-pump, or emetic of mustard (a tablespoonful of the powder in water), or sulphate of zinc (a scruple in water), or of ipecacuanha wine (a tablespoonful in water). 2. Tannic acid or gallic acid, or decoction of oak bark, or strong tea in unlimited quantities, after which the stomach should be again emptied. 3. Stimulants, brandy, chloric ether, ammonia, etc. 4. Warmth to the extremities by hot water bottles, hand rubbing, etc. 5. Artificial respiration, long continued. 6. The hypodermic injection of gr. $\frac{1}{40}$ of sulphate of atropia (3 minims of the 1 in 120 solution) may be tried.

Copper.—1. Give milk and eggs freely. 2. If necessary, induce vomiting by an emetic of mustard (a tablespoonful) and water, or ipecacuanha wine. 3. Give barley-water, or arrowroot, or gruel. 4. Give hypodermic injection of gr. $\frac{1}{2}$ of morphia, or give twenty-five drops of laudanum by mouth. 5. Apply linseed meal poultices to abdomen. *Fatal Dose.*—An ounce of the sulphate is usually fatal,

Corrosive Sublimate.—1. Stomach-pump, or emetic of mustard (a tablespoonful of the powder in water) or of sulphate of zinc (a scruple in water), or ipecacuanha wine (a tablespoonful in water). 2. White of egg (unboiled), mixed with water; to be given in unlimited quantities. Flour and water, arrowroot, or gruel, if at hand. Barley water. 3. Stimulants if much depressed. *Fatal Dose.*—Recovery possible after 20 grains, but a drachm nearly always fatal.

Creasote.—Treatment as for Carbolic Acid.

Croton Oil.—1. Stomach-pump, or emetic of mustard (a tablespoonful of the powder in water), or of sulphate of zinc (a scruple in water), or of ipecacuanha wine (a tablespoonful in water). 2. Demulcent drinks to be given freely. Barley water, white of egg and water, gruel, arrowroot. 3. Stimulants freely; brandy, sal-volatile, chloric ether. 4. A hypodermic injection of gr. $\frac{1}{3}$ of morphia, or twenty minims of laudanum by mouth, to be repeated in an hour it necessary. 5. Linseed poultices to abdomen. *Fatal Dose.*—Recovery after half a drachm or more.

Curari.—1. Artificial respiration to be kept up steadily until the poison is eliminated. 2. Stimulants freely; brandy, hot gin and water, sal volatile, chloric ether, etc. 3. If there be a surface wound, through which the poison has been introduced, apply a ligature tightly above it and wash the wound thoroughly. When the symptoms have subsided, the ligature may be cautiously loosened for a moment and then quickly reapplied. This should be done several times, at intervals, so as to allow only a very small quantity of the poison to pass into the system each time. 4. The surface of the wound should be thoroughly and repeatedly washed.

Cyanide of Potassium.—1. Large draughts of sulphate of iron (green vitriol) and water, to be taken at once. 2. Stomach-pump or emetic of mustard (a tablespoonful of the powder in water), or of sulphate of zinc (a scruple in water), or of ipecacuanha wine (a tablespoonful in water). 3. Give stimulants, such as brandy, liquor ammoniæ (half a drachm in water), sal volatile (a drachm in water), or hloric ether (half a drachm in water), frequently repeated. If patient cannot swallow, to be given in an enema, or brandy may be injected under the skin. Inhalations of ammonia on a pocket handkerchief should be tried. 4. Alternate hot and cold douche, the water being poured over the chest from a height. 5. Hypodermic injection of atropia gr. $\frac{1}{60}$ (2 minims to the 1 in 120 solution), or tincture of belladonna internally (30 drops in water). 6. Artificial respiration (20 in the minute), to be maintained for an hour or more. 7. Battery.—Mild interrupted current to chest walls, and over heart.

Dalby's Carminative.—Is said to contain gr. $\frac{1}{6}$ of morphia to the ounce. The treatment is as for opium poisoning.

Daturia.—For treatment, see Atropia.

Deadly Nightshade.—For treatment, see Belladonna.

Digitalis.—1. Stomach-pump, or emetic of mustard (a tablespoonful in water), or sulphate of zinc (a scruple in water), or ipecacuanha wine (a tablespoonful in water). 2. Twenty grains of tannic or gallic acid in hot water, repeated frequently, or hot strong tea or coffee. 3. Stimulants, such as hot gin or brandy and water, sal volatile, chloric ether, injected into rectum if not retained by stomach. 4. A hypodermic injection of gr. $\frac{1}{120}$ of aconite (2 minims of a one in 240 solution), or six minims of the tincture of aconite by mouth or rectum, to be repeated in half an hour if there be obvious improvement in the heart's action. 5. The recumbent position to be strictly maintained, even after all symptoms have subsided. *Fatal Dose.*—Recovery after taking two ounces of the tincture.

Duboisia.—For treatment, see Atropia.

Emerald Green.—This is an arsenite of copper. For treatment, see Arsenic.

Ergot.—1. Stomach-pump, or emetic of mustard (a tablespoonful in water), or of sulphate of zinc (a scruple in water), or ipecacuanha wine (half an ounce or more). 2. A purgative of castor oil (an ounce in water), or of Epsom salts (an ounce in water), or a drop or two of croton oil on the back of the tongue. 3. Tannic or gallic acid in half drachm doses in water frequently, or strong tea. To be introduced by the stomach-pump if necessary. 4. Stimulants such as brandy, sal volatile, or chloric ether. 5. Inhalations of nitrite of amyl, or a fifth of a grain of nitro-glycerine by mouth (2 minims of the 1 per cent. alcoholic solution), repeated every quarter of an hour. 6. Recumbent position.—Warmth to the extremities

Essential Oil of Almonds.—The poisonous properties of this oil are due to the presence of prussic acid. For treatment, see Prussic Acid.

Essential Salt of Lemons.—This is an acid oxalate of potash. For treatment, see Oxalic Acid.

Ether (*Inhalation*).—1. Pull the tongue well forward, and see that the mouth is clear. See that there is no obstruction by artificial teeth. 2. Commence artificial respiration at once, and keep it up for two hours if necessary, not faster than eighteen in the minute. 3. Loosen everything about the chest. Open the doors and windows, so as to have plenty of fresh air. Alternate cold and warm douche to the chest and head. 4. Inhalations of nitrite of amyl. 5. In apparently hopeless cases, two or three violent blows on the chest, delivered in quick succession, may restore the heart's action.

Fly Powder—Fly Papers—Fly Water.—These preparations all contain arsenic. For treatment, see Arsenic.

Fowler's Solution.—For treatment, see Arsenic.

Foxglove.—For treatment, see Digitalis.

Fungi.—For treatment, see Poisonous Mushrooms.

Gas (*escape of into room*).—For treatment, see Coal Gas.

Gelseminum or Gelsemium.—1. If seen soon after the dose has been taken, the stomach pump should be employed, or an emetic of mustard (a tablespoonful in water) might be given. Should a long interval have elapsed, the emetic would be useless and would probably increase the prostration. 2. A hypodermic injection of gr. 1-60 of atropia (2 minims of the 1 in 120 solution) should be given, and repeated in a quarter of an hour if there be failure of respiration. In the absence of atropia, fifteen drops of tincture of belladonna may be given by mouth. 3. Stimulants.—Brandy, chloric ether, sal volatile may be given if there are signs of failure of the heart's action. 4. Artificial respiration should be kept up steadily for at least three hours. 5. The cold and warm douche alternately over both head and chest.

Godfrey's Cordial.—It is said to contain half-a-grain of opium to the ounce. For treatment, see Opium

Hemlock.—See Conium.

Henbane.—See Hyoscyamus.

Hydrate of Chloral.—See Chloral.

Hydrochloric Acid.—1. Large draughts of sóap and water to be taken at once. Bicarbonate of potash, bicarbonate of soda, ammonia, sal volatile, or even common washing soda to be taken freely, well diluted with water. Magnesia or lime water may be used, if at hand. Dinniford's fluid magnesia is useful. 2. Milk, oil, thick gruel, white of egg and water, gum and water, and linseed tea, are all useful. 3. A hypodermic injection of morphia to ward off shock. As a rule, the stomach-pump cannot be employed with safety. Fatal dose.—A drachm usually fatal.

Hydrocyanic Acid.—1. Stomach-pump or emetic of mustard (a tablespoonful in water), or of sulphate of zinc (half-a-drachm in water), or of ipececuanha wine (an ounce), if a large quantity taken, and the patient seen at once. Time all important. 2. Give stimulants, brandy, chloric ether, ammonia, sal volatile *ad libitum*. If patient cannot swallow give an enema, or brandy may be injected hypodermically. Inhalations of ammonia on a pocket handkerchief. 3. Alternate hot and cold douche, the water being dashed over the patient, or poured over head and chest from a height. 4. A hypodermic injection of gr. 1-60 of atropia (2 minins of the 1 in 120 solution), or thirty drops of tincture of belladonna by mouth. To be repeated if necessary. 5. Artificial respiration (about 20 in the minute) to be kept up steadily. 6. Battery ; mild interrupted current to chest walls and over region of heart. Fatal dose.—From 40 minims to a drachm. Scheele's acid is double strength.

Hyoscyamus.—The treatment is the same as for Atropia.

Iodine.—1. Stomach pump, or emetic of mustard (a tablespoonful in water), or of sulphate of zinc (a scruple in water), or ipecacuanha wine (half an ounce or more). 2. Starch and water, or white of egg and water, given freely. 3. Inhalation of nitrite of amyl. 4. Hypodermic injection of gr. ⅓ of morphia to relieve pain, to be repeated as often as necessary.

Jaborandi.—The hypodermic injection of gr. 1-60 of atropia (2 minims of the 1 in 120 solution of sulphate of atropia), will at once arrest the symptoms. Twenty-five minims of tincture of belladonna by mouth will succeed almost as well.

Laburnam.—1. Stomach-pump, or emetic of mustard (a tablespoonful in water), or of sulphate of zinc (twenty grains in water), or of ipecacuanha wine (an ounce in water). 2. Stimulants in moderation ; brandy, chloric ether, sal volatile, etc. 3. Injection of a pint of hot strong coffee into the rectum. 4. Alternate hot and cold douche to the head and chest.

Laurel Water.—For treatment, see Prussic Acid.

Lead.—1. Stomach-pump, or an emetic of mustard (a tablespoonful), or of sulphate of zinc (twenty grains), or ipecacuanha wine (an ounce in water). 2. Give half a drachm of dilute sulphuric acid, or aromatic sulphuric acid, in water ; or half an ounce of sulphate of magnesia (Epsom salts); or half an ounce of sulphate of soda (Glauber's salts); or all three may be given together, freely diluted with water. 3. Milk, white of egg and water, barley water ; poultices to abdomen. 4. If much pain, a hypodermic injection of gr. ⅓ of morphia. 5. A course of iodide of potassium to eliminate the drug from the system. Fatal dose.—An ounce of the acetate should not prove fatal.

Lobelia.—As a rule lobelia induces vomiting, and an emetic is not required. In elderly people or young children, it may be necessary to use the stomach-pump, or give an emetic of mustard, sulphate of zinc, or ipecacuanha wine. 2. Tannic acid or gallic acic (half a drachm), frequently repeated, or strong tea. To be introduced with stomach-pump, or siphon if necessary. 3. Stimulants. Brandy, sal volatile, chloric ether, etc., to be given freely. 4. Twenty minims of tincture of nux vomica by mouth, or better, a hypodermic injection of gr. $\frac{1}{25}$ of nitrate of strychnia (2 minims of the 1 in 50 solution). 5. Warmth to the surface, hot blankets, hot water bottles, etc. 6. The recumbent position to be strictly maintained, even after the acute symptoms have subsided.

Lunar Caustic.—1. Common salt dissolved in water or milk should be given freely. 2. An emetic of mustard (a tablespoonful in water), or sulphate of zinc (twenty grains), or ipecacuanha wine (a tablespoonful in water). 3. White of egg and water, barley water, arrowroot, etc.

Lucifer Matches.—For treatment, see Phosphorus.

Morphia.—1. If taken by mouth, use stomach-pump, or give an emetic of mustard (a tablespoonful or more in water), or ipecacuanha wine (an ounce in water), or sulphate of zinc (twenty grains or more in water), or a hypodermic injection of gr. ^{1} of apomorphia may be given (10 minims of 1 in 50 solution). Wash out the stomach thoroughly. In morphia poisoning, vomiting is induced with difficulty. If the morphia were taken hypodermically, this treatment would be useless. 2. Keep the patient walking about, flap him with a wet towel, shout at him, and rouse him by every means in your power. Apply battery sharply to the limbs. Ammonia or sal volatile to the nose. 3. Inject a pint of strong coffee into the bowel, with stomach-pump, or enema apparatus. 4. Pour a large jug of cold water over his head from a height, and repeat it frequently, drying him in the intervals. 5. If signs of failure of respiration, give a hypodermic injection of gr. $\frac{1}{40}$ of sulphate of atropia (3 minims of the B.P. solution), repeating it in a quarter of an hour if necessary. Bartholow recommends gr. $\frac{1}{60}$ of atropia for every grain of morphia taken. If atropia cannot be obtained, give a hypodermic injection of fifteen minims of tincture of belladonna. 6. Inhalations of nitrite of amyl. 7. Artificial respiration to be kept up steadily for at least two hours. *Fatal Dose.*—Death from a grain of the acetate or hydrochlorate, but recovery after taking as much as twenty or thirty grains.

Morphia and Aconite.—1 Stomach-pump, or emetic of mustard (a tablespoonful or more in water), or of sulphate of zinc (twenty grains or more in water), or of ipecacuanha wine (an ounce in water). 2. Flap the patient with a wet towel, especially about the chest, or over the region of the heart. Give ammonia and chloric ether freely Keep him in the recumbent position and do not attempt to walk him about. 3. Warmth to extremities by hot towels or hot water bottles. Friction with the warm hand. 4. Atropia. A hypodermic injection of gr. $\frac{1}{60}$ of sulphate of atropia (2 minims of B.P. solution), or by mouth or rectum, 4 minims of the atropia solution, or twenty minims of tincture of belladonna. Should the pulse improve, repeat the dose in twenty minutes. 5. Coffee. An enema of a pint of hot strong coffee. 6. Nitrite of amyl. Inhalations of nitrite of amyl. 7. Battery. Interrupted current to the extremities. 8. Artificial respiration to be maintained for two hours if necessary.

Morphia and Chloral.—1. Stomach-pump, or emetic of mustard (a tablespoonful in water), or of sulphate of zinc (a scruple in water), or of ipecacuanha (a scruple of the powder in water). The stomach must be thoroughly washed out. 2. Rouse the patient by flapping him with a wet towel, etc. Ammonia to the nostrils. Cold douche to the head and chest, followed by warm douche. Patient to be kept warm. 3. Coffee. A pint of hot strong coffee to be injected into the bowel. 4. Atropia. Give a hypodermic injected of gr. $\frac{1}{40}$ of atropia (3 minims of B.P. solution of sulphate of atropia), repeated in a quarter of an hour if necessary. 5. Strychnia. If the symptoms of chloral poisoning predominate give a hypodermic injection of gr. $\frac{1}{25}$ of nitrate of strychnia (2 minims of the 1 in 50 solution), repeating it in half an hour if necessary, or fifteen minims of tincture of nux vomica may be given by mouth or rectum. 6. Artificial respiration to be maintained for at least two hours.

Muriatic Acid.—See Hydrochloric Acid.

Muscarine—Poisonous Mushrooms.—1. Stomach-pump or emetic of mustard (a tablespoonful in water), or sulphate of zinc (a scruple in water), or of ipecacuanha (a scruple of the powder in water. 2. Atropia. Give twenty drops of tincture of belladonna in water, or better, a hypodermic injection of gr. $\frac{1}{60}$ of atropia (2 minims of the B. P. solution), to be repeated in half an hour if necessary. 3. Castor oil. Give an ounce of castor oil to clear out the intestines. 4. Stimulants. Give stimulants such as brandy, spirits of ether (a drachm in water), spirits of chloroform (a drachm in water) or sal-volatile (a drachm in water). 5. Warmth to extremities and poultices to abdomen.

Nepenthe.—It is said to consist of purified extract of opium, citrate of morphia, and grape sugar mixed with sherry. For treatment, see opium.

Nicotine.—For treatment, see tobacco.

Nightshade.—For treatment, see belladonna.

Nitrate of Potash.—1. Stomach-pump or an emetic of mustard (a tablespoonful in water), or sulphate of zinc (a scruple in water), or ipecacuanha powder (a scruple in water). 2. Mucilaginous drinks, white of egg and water, linseed tea, olive oil, etc. 3. Stimulants if much collapse, five drops of essence of camphor on sugar, brandy and hot water freely. Brandy and water to be injected into rectum; or under skin if power of swallowing lost. 4. Warmth. Patient to be wrapped in hot blankets, hot water to feet, limbs to be kept warm by rubbing. Recumbent position to be strictly maintained. 5. Nitrite of amyl. Inhalations of nitrite of amyl. 6. Atropia. Hypodermic injection of atropia (3 minims of the B. P. solution) might be tried if there were signs of heart failure.

Nitrate of Silver.—1. Common salt dissolved in water or milk, should be given freely. 2. An emetic of mustard (a table-spoonful of the powder in water), or sulphate of zinc (twenty grains in water), or ipecacuanha (a scruple of powder in water). 3. White of egg, barley water, arrowroot, etc.

Nitric Acid.—1. Large draughts of soap and water to be taken at once. Bicarbonate of potash, bicarbonate of potash, bicarbonate of soda, ammonia, sal volatile, or even common washing soda, to be taken freely, well diluted with water. Magnesia or lime-water may be used if at hand. Dinneford's fluid magnesia is useful. 2. Milk, oil, thick gruel, white of egg and water, gum and water, and linseed tea, are all useful. 3. Morphia. A hypodermic injection of half a grain to ward off shock. As a rule the stomach-pump cannot be employed with safety. Fatal dose. Recovery after taking half an ounce.

Nitrite of Amyl.—1. Stomach-pump, or an emetic of mustard (a tablespoonful of the powder in water), or sulphate of zinc (twenty grains in water), or ipecacuanha (a scruple of the powder in water). 2. Fresh air. All windows and doors to be thrown wide open, and the patient fanned. 3. The recumbent position should be maintained. 4. Artificial respiration may be resorted to if necessary.

Nitro-Benzin—Nitro-Benzol.—1. Stomach-pump or emetic of mustard (a scruple of the powder), or sulphate of zinc (twenty grains in water), or ipecacuanha (a scruple of the powder in water). 2. Stimulants, such as brandy, liquor ammoniæ (half a drachm in water), or chloric ether (a drachm in water) frequently repeated. If patient cannot swallow, to be given as enema, or brandy may be injected under skin. Inhalations of ammonia on pocket-handkerchief. 3. Douche. Alternate hot and cold douche, the water being poured over the chest from a height. 4. Atropia. Hypodermic injection of gr. $\frac{1}{60}$ of atropia (2 minims of the B. P. solution), or thirty drops of tincture of belladonna. 5. Artificial respiration to be maintained till the patient has recovered, or no further pulsation can be detected at the heart. 6. Battery. Mild interrupted current to chest-walls, and over region of the heart. *Fatal dose.*—Death in some cases from merely tasting it.

Nitro-Glycerine.—1. Recumbent position to be strictly maintained. 2. Cold water cloths or ice to be applied to head. 3. Ergot. Twenty drops of liquid extract of ergot by mouth, or a grain of ergotin (two minims of the 1 in 2 solution) might be injected subcutaneously, and repeated in a quarter of an hour. 4. Atropia. A hypodermic injection gr. $\frac{1}{60}$ of sulphate of atropia (two minims of the B. P. solution), or twenty drops of tincture of belladonna by mouth. The symptoms are often alarming, but death rarely occurs.

Nitrous Oxide Gas.—1. Pull the tongue well forward and see that the mouth is clear. See that there is no obstruction by artificial teeth. 2. Artificial respiration to be commenced at once, and kept up for two hours if necessary, not faster than eighteen in the minute. 3. Fresh air. Loosen everything about the chest and neck. Open the doors and windows wide and fan the patient. Alternate hot and cold douche to chest and head. 4. Oxygen gas. Inhalations of oxygen gas, three or four pints. 5. In apparently hopeless cases two or three violent blows on the chest, delivered in quick succession, may restore the heart's action.

Nux Vomica.—1. Stomach-pump, or stomach-siphon, if available at once, for after tetanic symptnms have set in the introduction of the tube would excite a paroxysm. 2. Emetic of sulphate of zinc (half-a drachm in water), or mustard (a tablespoonful in water) or ipecacuanha (a scruple of the powder in water). Should a difficulty be experienced in opening the jaw, put the patient under chloroform, or ether, or give a hypodermic injection of gr. $\frac{1}{6}$ of apomorphia (10 minims of the 1 in 50 solution.) 3. Animal chorcoal *ad libitum*, or tannic acid, or tincture of iodine. To be followed by stomach-pump, or another emetic. 4. Bromide of potassium (half an ounce) in bad cases, with chloral (thirty grains) to be followed by the bromide (in two drachm doses) with or without chloral (ten grains) every fifteen or twenty minutes if necessary. 5. Nitrite of amyl inhalations. 6. Chloroform or ether to the extent of producing muscular relaxation. 7. Curare. A hypodermic injection of gr. $\frac{1}{3}$ (4 minimims of the 1 in 12 solution) may be given. 8. Artificial respiration if possible.

Opium.— 1. Stomach-pump or Emetic of mustard (a tablespoonful of the powder in water), or sulphate of zinc (twenty grains in water), or ipecacuanha (a scruple of the powder in water). 2. Rousing. Keep the patient walking about, flap him with a wet towel, shout at him, pinch him, and rouse him by every means in your power. Apply the battery to the limbs sharply. Ammonia or sal-volatile to the nostrils. 3 A pint of hot strong coffee injected into the bowel. 4. Douche. Pour a large jug of cold water over his head from a height, and repeat it frequently, drying him in the intervals. 5. Atropia. Give a hypodermic injection of gr. $\frac{1}{40}$ of sulphate of atropia (3 minims of the B.P, solution) if signs of failure of respiration. If atropia not at hand give fifteen minims of tincture of belladonna by mouth. Either might be repeated in a quarter of an hour. It is said that gr. $\frac{1}{40}$ of atropia will antagonize one grain of morphia. 6. Nitrite of amyl. Inhalations of nitrate of amyl if at hand. 7. Artificial respiration should be kept up for at least two hours.

Opium and Belladonna.—1. Stomach-pump or Emetic of mustard (a tablespoonful of the powder in water), or of sulphate of zinc (twenty grains in water), or of ipecacuanha (a scruple of the powder in water). 2. Coffee. An enema of a pint of hot strong coffee. 3. Rousing. The patient should be kept awake. Flicking with a wet towel, and mustard to the calves of the legs and over the region of the heart will be found useful. 4. Artificial respiration may be resorted to if necessary.

Opium and Chloral.—1. Stomach-pump, or Emetic of mustard (a tablespoonful of the powder in water), or of sulphate of zinc twenty grains in water), or of ipecacuanha (a scruple of the powder in water). The stomach should be thoroughly washed out. 2. Rouse the patient by flapping him with a towel. Ammonia to the nostrils. Cold douche to the head and chest, followed by warm douche. Patient to be kept warm. 3 Coffee. Give hot strong coffee or inject it into the bowel. 4. Atropia. Give a hypodermic injection of gr. $\frac{1}{40}$ of atropia (3 minims of the B.P. solution), repeating it in a quarter of an hour if necessary. 5. Strychia. Should the symptoms of chloral poisoning predominate, give a hypodermic injection of gr. $\frac{1}{40}$ of sulphate of strychnia (2 minims of the B.P. solution), or gr. $\frac{1}{25}$ of nitrate of strychnia (2 minims of the 1 in 50 solution), repeating it in half an hour if necessary, or fifteen minims of tincture of nux vomica may be given by mouth or rectum. 6. Artificial respiration to be maintained for some hours if nececsary.

Oxalic Acid.—1. Chalk, lime or whitening, given freely in water. The whitewash from a wall, or fence, or ceiling, may be used. Lime-water is an antidote, but the saccharated solution being stronger, is preferable It should he given in drachm doses frequently repeated. 2. Castor oil. An ounce of castor oil should be given to clear out the intestines. The administration of potash, soda, ammonia, or their carbonates should be avoided. *Fatal Dose.*—From half an ounce to an ounce.

Phosphorus.—Emetic of sulphate of zinc (twenty grains in water), or ipecacuanha wine (a scruple of the powder in water). 2. Sulphate of Copper in three grain doses dissolved in water, every five minutes till vomiting is induced. Continue the sulphate of copper in grain doses every quarter of an hour, giving with it ten drops of acetate of morphia, if rejected. 3. French oil of turpentine. Half drachm doses of the French oil of turpentine may be given every half hour, but the German and American turpentines are useless. 4. A purgative of half an ounce of Epsom salts. N.B. Oils and fats should on no account be given.

Physostigma,—1. Stomach-pump, or an Emetic of mustard (a tablespoonful of the powder in water), or of sulphate of zinc (twenty grains in water), or of ipecacuanha (a scruple of the powder in water). 2. Atropia. A hypodermic injection of gr. $\frac{1}{60}$ of sulphate of atropia (two minims of the B.P solution), or fifteen drops of tincture of belladonna by mouth or rectum. To be repeated every quarter of an hour for an hour, or until the pupils dilate, or the pulse is quickened. 3. Chloral. Should the above fail, give ten grains of chloral by mouth or rectum, every quarter of an hour. 4. Strychnia. In very bad cases, hypodermic injection of gr. $\frac{1}{60}$ of sulphate of strychnia (2 minums of the B. P. solution), or gr. $\frac{1}{12}$ of nitrate of strychnia (4 minims of the 1 in 50 solution,) or 20 minims of tincture of nux vomica by mouth or rectum. 5. Stimulants freely; brandy, chloric ether, sal volatile. 6. Artificial respiration.

Picrotoxine.—1. Stomach-pump, or emetic of sulphate of zinc (twenty grains in water), or mustard (a tablespoonful in water), or ipecacuanha (a scruple in water). 2. Chloral. Twenty grains in water, with ten grains more in a quarter of an hour, if necessary. 3. Bromide of potassium. If tetanus, may be given in two drachm doses every quarter of an hour, in addition to the chloral.

Pilocarpine.—Atropia. The hypodermic injection of gr. $\frac{1}{60}$ of atropia (2 minims of the B.P. solution of sulphate of atropia), will at once arrest the symptoms. Twenty-five minims of tincture of belladonna by mouth will succeed almost as well.

Pituri.—*For treatment,* see Atropia.

Poisonous Mushrooms.—1. Emetic of mustard (a tablespoonful in water), or sulphate of zinc (twenty grains in water), or ipecacuanha wine (a scruple of the powder in water). 2. Atropia. Give twenty drops of tincture of belladonna in water, or better, a hypodermic injection of gr. $\frac{1}{60}$ of atropia (2 minims of the B.P. solution) to be repeated in half-an-hour if necessary. 3. Castor oil. Give an ounce of castor oil to clear out the intestines. 4. Stimulants, such as brandy, spirits of ether (a drachm in water), spirits of chloroform (a drachm in water), or sal volatile (a drachm in water). 5. Warmth to the extremities, and poultices to the abdomen.

Potash.—1. Give water freely, with vinegar, acetic acid, citric acid, lemon juice, or orange juice. 2. Demulcent drinks, such as white of egg and water, milk, gruel, and barley water. 3. Olive oil given freely.

Prussic Acid.—1. Stomach-pump, or Emetic of mustard (a tablespoonful in water) or sulphate of zinc (twenty grains in water) or ipecacuanha (a scruple in water). 2. Stimulants, such as brandy, liquor ammoniæ (half a drachm in water), sal volatile (a drachm in water), or chloric ether (a drachm in water), frequently repeated. If patient cannot swallow, to be given as enema, or brandy may be injected under the skin. 3. Douche. Alternate hot and cold douche, the water being poured over the chest from a height. 4. Atropia. Hypodermic injection of gr. $\frac{1}{60}$ (2 minims of the B.P. solution), or thirty drops of tincture of belladonna may be given by mouth. 5. Artificial respiration should be kept up as long as necessary. 6. Battery. Mild, interrupted current to chest-walls, and over region of heart. *Fatal dose.*—From 40 minims to a drachm. Scheele's acid is of double strength.

Rat Pastes.—Generally contain phosphorus. Sampson's is said to contain arsenic as the active ingredient.

Resorcin—1. Stomach-pump, or emetic of mustard (a tablespoonful of the powder in water), or of sulphate of zinc (a scruple in water), or of ipecacuanha wine. 2. White of egg and water in large quantities. 3. Wash out the stomach with soda, or with saccharated lime, mixed with large quantities of tepid water. 4. Stimulants freely; hot brandy and water, chloric ether, and sal volatile. 5. Warmth to the extremities. Friction with the warm hand. Interrupted current. 6. Atropia. Hypodermic injection of gr. $\frac{1}{60}$ of sulphate of atropia (2 minims of 1 in 120 solution). 7. Inhalations of nitrite of amyl. *Fatal dose.*—Two drachms nearly proved fatal.

Salt of Sorrel.—This is an acid oxalate of potash. For treatment, see Oxalic Acid.

Savin.—1. Emetic of mustard (a tablespoonful of the powder in water), or sulphate of zinc (twenty grains in water), or ipecacuanha (a scruple of the powder in water). 2. Castor oil, an ounce. 3. Linseed meal poultices to abdomen. 4. Morphia. Hypodermic injection of gr. $\frac{1}{3}$ if necessary.

Scheele's Acid.—This is twice the strength of ordinary prussic acid For treatment, see Prussic Acid.

Scheele's Green.—This is arsenite of copper. For treatment, see Arsenic.

Snake Bite.—1. Ligature. A ligature—a pocket-handkerchief, or piece of rope, if nothing better at hand, should be tied tightly round the limb between the wound and the heart. 2. Cauterization. The wound should be thoroughly washed and sucked. The bitten part should be excised or cauterized by a hot iron, or strong nitric acid, or if no better means be available by exploding gunpowder on the part. 3. Stimulants. Brandy, whiskey, champagne,&c.,should be given freely even to the extent of making the patient drunk. 4. Artificial respiration should be maintained for some hours. 5. The ligature should be removed only for a second or two at a time, and then quickly re-applied so as to admit only a very small quantity of the poison into the circulation. 6. Inject under the skin in two places, 20 minims of Condy's fluid or solution of permanganate of potash, or give by mouth a teaspoonful in an ounce of water. 7. Ammonia. Halford's plan consists in the injection into the radial vein, by means of a hypodermic syringe, of about twelve minims of the liquor ammoniæ fortior, diluted with three times its volume of water. The vein should be first exposed. 8. Bleeding followed by transfusion might in some cases prove of avail.

Soap Lees.—This consists of carbonate of potash, or soda mixed with caustic alkali. For treatment, see Potash.

Soda.—1. Vinegar, acetic acid, citric acid, lemon juice, or orange juice freely diluted with water. 1. Demulcent drinks, such as white of egg and water, milk, gruel and barley water. 3. Olive oil freely.

Soothing Syrup.—The preparations sold under the name usually contain opium. For treatment, see Opium.

Stramonium.—1. Stomach-pump or Emetic of mustard (a tablespoonful of the powder in water), or of sulphate of zinc (twenty grains in water), or of ipecacuanha (a scruple of the powder in water). 2. Stimulants, such as brandy, champagne, sal volatile or chloric ether. 3. Coffee. An enema of a pint of hot strong coffee. 4. Mustard to the calves of the legs, hot water bottles to the feet, rousing by flicking with a wet towel, alternate hot and cold douche, interrupted current to the limbs, etc. 5. Pilocarpine. A hypodermic injection of half a grain of pilocarpine (10 minims of the 1 in 20 solution) to be repeated in half an hour if necessary, or two drachms of tincture of jaborandi by mouth or rectum. 6. Artificial respiration to be maintained for two hours if necessary.

Strychnia.—1. Stomach-pump, if it can be quickly obtained, for after tetanic symptoms have set in, the introduction of the tube would excite a paroxysm, and it would be useless. An emetic of mustard (a tablespoonful of the powder in water), or sulphate of zinc (twenty grains in water), or ipecacuanha (a scruple of the powder in water). Should a difficulty be experienced in opening the jaw, a hypodermic injection of apomorphia (10 minutes of the 1 in 50 solution) should be given, or the patient may be put under chloroform or ether. 2. Animal charcoal *ad libitum* or tannic acid *ad libitum*, or tincture of iodine. To be followed by an emetic, or stomach-pump. 3. Bromide of potassium, in a half ounce dose in water, with thirty grains of chloral. Two drachms of the bromide with or without ten grains of chloral may be given every fifteen or twenty minutes if necessary. 4. Nitrite of amyl inhalations, the amyl being poured freely on a handkerchief and held close to the nose. 5. The patient may be kept fully under chloroform or ether. *Fatal dose.*—From half a grain to two grains.

Sugar of Lead.—For treatment, see Lead.

Sulphat of Copper.—For treatment, see Copper.

Sulphate of Zinc.—For treatment, see Zinc.

Sulphuric Acid.—1. Soap and water, chalk and water, whitewash and water, to be taken freely. 2. Magnesia, lime water, or bicarbonate of soda, or bicarbonate of potash. Common washing soda diluted freely with water will do. Dinneford's fluid magnesia is very useful. 3. Milk, white of eggs, oil, linseed tea, thick gruel, or arrowroot, are all useful. 4. Morphia. A hypodermic injection of half a grain to ward off shock. As a rule the stomach-pump cannot be employed with safety. *Fatal dose.*—A drachm might prove fatal, or patient might recover after taking an ounce or more. Much depends on the degree of concentration and on the condition of the stomach as regards food.

Syrup of Poppies.—For treatment, see Opium.

Tartar Emetic—Tartarated Antimony..—For treatment, see Antimony.

Tartaric Acid.—1. Chalk, lime, or whitening given freely in water. The whitewash from a wall, or fence, or ceiling, may be used. Lime water is an antidote, but the saccharated solution being stronger is better. It should be given in drachm doses frequently repeated. 2. Castor oil. An ounce of castor oil should be given to clear out the intestines. The administration of potash, soda, ammonia, or the carbonates should be avoided.

Tobacco.—1. Stomach-pump or Emetic of mustard (a tablespoonful in water), sulphate of zinc (twenty grains in water), or ipecacuanha (a scruple of the powder in water). 2. Tannic acid, half a drachm in water repeated frequently, or strong tea. To be introduced by the stomach-pump, if necessary. 3. Nux Vomica. Twenty minims of nux vomica by mouth, or better a hypodermic injection of gr. $\frac{1}{25}$ of strychnia (2 minims of the 1 in 50 nitrate of strychnia solution). 4. Stimulants, brandy, champagne, sal volatile, chloric ether, to be given freely. 5. Warmth to the surface by hot bricks, hot blankets, etc. Friction with the warm hand. 6. Recumbent position should be strictly maintained.

Turpentine.—1. Stomach-pump or Emetic of sulphate of zinc (twenty grains in water), or ipecacuanha (a scruple of the powder in water). Should these fail, a hypodermic injection of gr. $\frac{1}{5}$ of apomorphia (10 minims of the 1 in 50 solution) may be given. 2. Sulphate of magnesia, an ounce in water as a purgative. 3. Demulcent drinks, such as milk, white of egg and water, barley water, etc. 4. Morphia. If much pain, a hypodermic injection of half a grain of morphia, or thirty drops of laudanum by mouth.

Veratria.—1. Stomach-pump or Emetic of mustard (a tablespoonful of the powder in water), or sulphate of zinc (twenty grains in water), or of ipecacuanha (a scruple of the powder in water). 2. Stimulants, brandy, champagne, chloric ether, sal volatile, etc. 3. Coffee. Hot strong coffee, injected into rectum if necessary. 4. Warmth to the extremities, hot water bottles, warm blankets, friction with the warm hand, etc. 5. Recumbent position to be strictly maintained.

Verdegris.—This is subacetate of copper For treatment, see Copper.

Vermin Killers.—Usually contain strychnia. For treatment, see Strychnia.

White Precipitate.—1. Stomach-pump, or Emetic of mustard (a tablespoonful of the powder in water), or sulphate of zinc (twenty grains in water), or ipecacuanha (a scruple in water). 2. White of egg (unboiled), mixed with water, to be given in unlimited quantities. Flour and water, arrowroot, gruel, barley water, and linseed tea, are all useful. 3. Stimulants, brandy, chloric ether, sal volatile. Not a very active poison; might recover after taking three drachms or more.

White Vitriol.—For treatment, see Zinc.

Woorara.—For treatment, see Curari.

Zinc.—1. Carbonate of soda or carbonate of potash in large quantities dissolved in warm water. Common washing soda will do if well diluted. 2. Milk and eggs freely with tepid water. 3. Tannic acid, gallic acid, decoction of oak bark, or strong tea. 4. Morphia. A hypodermic injection of half a grain, or thirty drops of laudanum by mouth. 5. Linseed meal poultices to abdomen. 6. If much pain in the abdomen, an enema of gruel, or starch and water, may be given.

NOTE.—Apomorphia is an uncertain remedy when given by mouth, and should always be administered hypodermically if possible.—WILLIAM MURRELL.

POISON WOUNDS FROM BITES OF POISONOUS SNAKES. —*Symptoms.*—Local, are rapid swelling, redness, lividity, phlyctenulæ filled with sanious fluid; swelling spreads, whole body assumes a jaundiced hue; resemblance to ordinary phlegmonous erysipelas; but "the first symptom, in nearly all cases, appears to be a general shock to the nervous system;" faintness, tremor, great depression, sometimes stupor, loss of sight, vomiting, trismus, and general insensibility; great local pain. *Pathology.*—First effect, is a shock to the nervous system; second, is a diffuse cellulitis, spreading from the wound. It appears that virulent snake-poison may be applied to slight abrasions, to denuded muscle, cartilage, periosteum, to mucous membrane, and even to the medullary cavity of bones, with no more effect than local irritation, though the same poison inoculated into the subcutaneous cellular tissue would be rapidly fatal. *Prognosis.*—Depends on relative size of snake and victim, on situation of wound (worst when on face or trunk), and, of course, on kind of snake. See G. Bush in Holmes's system. *Treatment.*—Ligature above part bitten; sucking wound; caustics, actual cautery; excision; injection of wound with ammonia or carbolic acid; injection of ammonia into the veins (Halford); liq. ammon. fort. m x, ad aquæ m xx, to be injected into a large vein near the wound; rubbing with olive oil. The strength must be kept up with milk, eggs, wine, soups, &c.; the spirits must be cheered.—C. B. KEETLEY.

POLYDIPSIA } *See Diabetes Insipidus.*
POLYURIA }

PORRIGO.—*Definition.*—A local disease of the skin, communicable by inoculation, excited most commonly by accidental irritation, and characterized by an eruption of flat vesicles, which rapidly change into pustules and dry into yellow friable crusts.

Symptoms.—From scratching or from any accidental irritation of the skin there arises, usually on the face or head, but sometimes on the hands, an eruption of issolated small vesicles, which soon become pustular and then dry into yellow scabs. These scabs vary in size from a split pea to a shilling, and appear as if "stuck on," since there is no inflammatory areola around them. Dr. Tilbury Fox, who first distinguished the disease as a separate affection, states that the eruption is generally preceded by a slight pyrexia, and by malaise and sensations of chillness; also that it is accompanied by severe itching, which is particularly troublesome at night.

On removing the scabs a reddened base secreting a gummy, purulent fluid, which does not stiffen linen like that of eczema, is seen, and as the disease abates the scabs fall off from the erythematous base and the red spots gradually fade.

When the head is affected the posterior cervical glands are apt to enlarge, and if the disease be neglected pediculi may be present among the scabs. The disease is spread from one part of the body to another, and from one person to another, by the direct inoculation of the pus.

Diagnosis.—The eruption of discrete vesicles, which soon become pustules and scabs, the absence of serous discharge and the presence of pus, the inoculability, the contagiousness and the slight pyrexia which precedes it, are the points which are supposed to separate porrigo from eczema.

Prognosis.—The disease runs an acute course, and usually lasts about a fortnight. It may be prolonged by successive eruptions, but is never dangerous to life.

Treatment.—The removal of the scabs by oiling and poultices, and the subsequent application of a mild mercurial ointment, or a carbolic acid lotion (1 in 20), to destroy the infective character of the pus, are the remedies that are needed to effect a cure.—MALCOLM MORRIS.

POSE—*See Influenza.*

POST-PARTUM HÆMORRHAGE.—DURING THE THIRD STAGE.

—*Definition.*—Hæmorrhage, the result of partial separation of the placenta, with insufficient contraction of the uterus. *Causes.*—Inefficient contractile power of the uterus to throw off the placenta rapidly, or morbid adhesion of part of the placenta ; the source of the hæmorrhage being the uterine sinuses. *Symptoms.*—Fainting, restlessness, collapse. *Signs.*—Free or severe continuous hæmorrhage. *Treatment.*—Ergot (extr. liq. ʒ ss.—ʒ j). Attempt removal of the placenta by expression ; or, if that fail, remove it manually.

After the Third Stage.—*Definition.*—True post-partum hæmorrhage. *Causes.*—Tedious labor, too rapid labor, inefficient uterine contraction, or relaxation of that organ after contraction. *Symptoms.*—Fainting, collapse. *Signs.*—Small, feeble, rapid pulse ; continuous and alarming hæmorrhage. *Diagnosis.*—From rupture of varicose veins of vulva by careful examination. *Treatment.*—Grasp and knead the fundus uteri ; injection of cold water ; pass pieces of ice into the vagina, or better still, into the uterus ; ergot ; galvanism. If all other means fail, swab out the uterus with a solution of the persulphate of iron or of the perchloride (1 of strong liquor to 4 of water)

Secondary Post-partum Hæmorrhage.—*Definition.*—Hæmorrhage coming on from the third to the fourteenth day post-partum. *Causes.*—Irregular contraction of the uterus ; the retention of a portion of adherent placenta preventing firm contraction of the uterus in its immediate neighborhood. *Symptoms.*—Restlessness, often with symptoms of septic mischief. *Signs.*—Frequent pulse, pain over the uterus, hæmorrhage continuous and bright, the source being the open ends of the uterine arteries. *Diagnosis.*—From symptoms and signs as above. *Prognosis.*—Often unfavorable. *Treatment.*—If necessary, open the os uteri with dilating bags, carefully explore the interior of the uterus, and remove the portion of placenta. Intra-uterine injections of iodine, tincture of matico, glycerin, and carbolic acid, equal parts ; or swab out the uterus with solution of perchloride of iron as above.—Heywood Smith.

POX—*See Syphilis.*

PREGNANCY, Hæmorrhage of—*See Hæmorrhage of Pregnancy.*

PRESBYOPIA—*See Refraction.*

PRIAPISM—*See Penis, Diseases of.*

PRICKLY HEAT, or LICHEN TROPICUS.—Occurs in the tropics mostly, but in a milder form elsewhere in the summer months. It is seen as a minute, red, very itchy, pimply rash, due in part to inflamed sweat follicles and to hyperæmic papillæ, which occur, we hold, secondarily to the other condition. Lichen tropicus attacks the surface of the body, the limbs, and often the face, and is interspersed with sudamina, here and there. The itching is increased by heat, drinking hot liquids, etc. Much difference of opinion exists as to its anatomical seat. To those who are interested in the matter we commend the clinical observations on the disease contained in the report of Dr. Farquhar and ourselves on endemic skin diseases of hot climates.

Treatment.—This consists of giving diuretics freely; avoiding all stimulants ; wearing thin clothing ; taking light food ; using alkaline baths ; and smearing the surface with whiting made into a thin paste, or some simple emollients.—*Epitome of Skin Diseases—Fox.*

PROGRESSIVE MUSCULAR ATROPHY—*Natural History.*—A peculiar wasting of muscles, with atrophy of their contractile substance, and lesion in the anterior roots of the nerves of the spinal cord, with progressive paralysis.

It seems to be still an open question whether progressive muscular atrophy is really a substantive disease of the muscular texture, or dependent on a structural change in the spinal cord. The College of Physicians have numbered it and classed it among diseases of the muscular system. This is also the view adopted by Niemeyer, who believes that the long dispute as to the nature of this disease has been decided in favor of those who regard progressive muscular atrophy as a primary muscular affection; since almost all observers have agreed in regarding the continuance of excitability in the atrophied muscles, as long as they contain muscular elements, to be the pathognomonic sign of the disease. The nerves and muscles alike retain their excitability till the muscles perish. A similar paralysis coexists with a great increase of bulk of the muscle-masses, but which is really an atrophy, the bulk being due to a growth of connective tissue and not muscle tissue, which latter wastes away probably by continuous absorption. (See cases described in *Lancet*, May 8, 1869, by Dr. Balthazar Foster of Birmingham. I saw a similar case in the practice of Dr. Lake of Southampton, in 1873).

The invasion of wasting palsy is usually slow and insidious. It creeps on unawares; and the victim of its attack only becomes cognizant of the disease when he notices some marked failure in certain muscular powers. The tailor notices that he cannot hold his needle; the shoemaker wonders that he cannot thrust his awl; the mason's hammer has grown too heavy for his strength; the gentleman feels an awkwardness in handling his pen, in pulling out his pocket-handkerchief, or in putting on his hat. On comparing the weakened member with its fellow, it is seen to be wasted, and the failure of power increases; the lifting power is reduced to nothing; the grasp is gone; and at last palsy becomes complete. In the majority of cases, the disease commences in the upper extremities; and if it commences in the legs, it is probable that the atrophy will spread to the trunk. In more than one-third of the cases the hand was the member originally seized; and the exact spot nearly always the ball of the thumb, and the right hand more often than the left. Next to the hands, one or other shoulder is the favorite starting point. Loss of power is a chief phenomenon, and it corresponds to the grade of atrophy of the muscle; it is only in extreme cases that any part is reduced to absolute immobility. Muscular vibrations, consisting of little convulsive twitchings or quiverings of individual muscular bundles, are also early phenomena. They do not impart any movement to the entire muscle, but parts of the muscle seem to spring beneath the skin in quick momentary tremors, undulating over the surface of the muscle. Tactile sensation generally retains its delicacy in the skin over the affected muscles; but in some cases anæsthesia has been noticed, with exaggerated facility of reflex movement, chiefly in the muscles subject to the quiverings already described. Electric contractility exists, but is less in the affected muscles, and the amount of diminution is in direct proportion to the degree of their atrophy. Pain is by far the most common of the nervous symptoms; generally transient and usually most marked at the commencement of the disease.

Unusual sensitiveness to low temperature is a prominent and very annoying symptom; the temperature of the affected parts is always lowered. As a rule, the general health does not seem impaired. Intelligence is clear, judgment firm, the emotions under control, and all the organic functions appear to be performed with regularity.

The treatment of wasting palsy ought to be strictly a restorative one. Preparations of steel, wine, and of cod-liver oil, with localized faradization, are the most likely agents to improve the condition of the body. Local means will aid the hygienic—namely, methodical exercise and douche baths, or cold mineral baths; so also thermal or sulphur baths, and galvanism. Frictions, with stimulating liniments (such as camphor liniment) are also favorably spoken of. Faradization ought to be practiced at least three times a week, for from five to ten minutes each time, and continued at least a month before it is given up, if negative results are only obtained. Every muscle ought to be faradized in a special manner, according as it has suffered more or less in its electric contractility and nutrition. The power of the current ought never to be strong. When the sensibility of the muscle returns, the intensity of the current may be diminished. Its application should never be protracted beyond ten or fifteen minutes at the most, one minute, on an average, being allowed to each muscle, or distributed over several at a time.

The application of the constant current of electricity—the positive electrode being placed in the region of the cervical sympathetic, and the negative electrode upon the cervical and upper dorsal regions of the spine, have been followed by long amelioration, if not by a positive cure.—WILLIAM AITKEN.

PROSTATE.—*Chief Affections.*—Inflammation, acute and chronic; abscess, periprostatic abscess; hypertrophy; simple tumors; atrophy; tubercle; cysts; malignant disease.

PROSTATE, ACUTE INFLAMMATION OF.—*Causes.*—Gonorrhœa, cystitis, strong injections, cauterization, mechanical injuries, *e. g.*, from sounds. Catching cold, alcoholic excesses, and sexual excitement will determine an attack if some other influence pre-exist, such as gonorrhœa, gout, or rheumatism. *Symptoms.*—Local pain extending into loins and back, weight, and fullness. Frequent and painful micturition, especially painful at the close of the act. Pain becomes shooting and throbbing. Anal and perineal tenderness and fullness. Defecation painful. Micturition often difficult or impossible. Fever. Pus in urine when abscess bursts. *Per anum* the prostate can be felt enlarged. Piles may be induced. *Treatment.*—Rest in bed. An aperient to commence with. Antimony. Acetate of potash in full doses. Ten to twenty leeches to perineum and round anus. Hot hip-bath. Poultices to perineum. Retention usually relieved by hot baths and liq. opii. Or a soft catheter may be passed. Prostate remains for a long time afterwards enlarged and hard, obstructing flow of urine.

PROSTATE, CALCULUS OF.—See Calculus.

PROSTATE, CHRONIC INFLAMMATION OF.—Usually a sequal of acute. Generally, but not always, enlargement of the gland. Obstruction to passage of urine. Anal and perineal pain. Gleety discharge. Sometimes nocturnal emissions. Pain in sexual intercourse. Irritable bladder. *Treatment.*—Rest. Regular and unstimulating diet. Tonics and stomachics. Iron, with a mild aperient. Counter-irritation to perineum. For the nocturnal emissions, make three or four applications of a solution of nitrate of silver (gr. x-xxx to ℥ j) to the prostatic part of the urethra. As Sir H. Thompson says, "To be sucessful an efficient instrument is absolutely necessary, as well as care in injecting the fluid at the right spot." For enlargement of prostate left by acute inflammation give a prolonged course of pot. iod. and pot. bromid.; sea-bathing and tonics.

PROSTATIC ABSCESS.—1. *Acute.*—When prostatitis leads to abscess, the acute symptoms persist for more than a week or two, pain and tenderness increase, rigors probably occur, and the prostatic swelling may throb. Fluctuation may be felt sooner or later, perhaps, per rectum. Abscess tends to open into urethra, more rarely into rectum. Either termination is of good prognosis. In exceptional cases, abscesses recur again and again. *Treatment.*—Incise early in the median line of the perineum. Foment and poultice. "When the suppuration is due to stricture, and probable extravasation, the propriety of dividing the stricture and laying open the perineum down to the prostate cannot be questioned," (Bryant). 2. *Chronic Prostatic Abscess.*—Either a sequel of acute abscess or the direct result of old stricture of urethra. Whole prostate may be destroyed. Condition always serious. Chronic cystitis, progressive emaciation. *Treatment.*—Rest, highly tonic and soothing regimen, fresh air. Sometimes perineal incision is indicated.

Prostate, Hypertrophy of.—A senile affection. Never occurs before fifty, usually over sixty. But, of old men, it attacks no greater a proportion than one-half. Affects every constituent of the prostate, but chiefly the muscular and fibrous elements. Enlargement may be general or limited. In the latter case, an outgrowth sometimes occurs from the centre of the gland backwards towards the bladder, improperly called the "enlarged third lobe." Either lateral lobe may be disproportionately hypertrophied. Isolated, almost independent tumors (myomata) are very common in the substance of hypertrophied prostates. They contain very little glandular substance, and that ill-developed. *Effect on the Urethra.*—Prostatic part of urethra is lengthened, and its antero-posterior diameter increased, while its transverse diameter is lessened. Its direction is altered in a manner which varies according to the part of the gland which is enlarged. The urethra takes an abnormal curve whose concavity corresponds to the lateral lobe most enlarged. So also the vesico-urethral orifice takes a crescentic form with the concavity towards the enlarged lobe. When the "third lobe" is enlarged, the urethra is bent suddenly upwards in front of it. Occasional outgrowth of median portion of prostate, overlapping vesico-urethral orifice as a valve, which obstructs the flow of urine. Size of enlarged prostate often very considerably increased. Diameter of over four inches and weight of twelve ounces known. A weight of even one ounce signifies hypertrophy. Consistence varies. *Symptoms.*—(In earliest stage *nil*). Diminution of force with which urine is ejected. Frequent desire to micturate; micturition is, as it were, incomplete. Uneasiness and weight about perineum and neck of bladder. Tenesmus. Hæmorrhoids tend to develop. Sometimes flattened stools. After a time, chronic cystitis. Sometimes urethral discharge, or frequent erections of penis. Urinary obstruction increases; bladder overflows at night. Bladder-dulness tends to ascend higher and higher in abdomen. General health gets worse. Accidental circumstances, *e.g.*, slight excesses, bring on attacks of retention. Small hæmorrhages. Urinary changes similar to those of chronic cystitis. Neutral or alkaline reaction. Mucus. Phosphatic masses, soft and white. Muco-pus. Diagnosis is usually determined by examination with the left forefinger in the rectum. Information may be thus acquired concerning the size, shape and consistence of the prostate, and concerning the presence, absence, or position of fluctuation. Such examination is assisted by simultaneously manipulating a catheter in the urethra. "If the catheter has passed easily, say nine or ten inches, and still no urine flows; and if, in addition, while following its course, the handle has become more than usually depressed, there will be little doubt in respect of the existence of prostatic enlargement." (Thompson.) Of course, with a healthy urethra, urine should flow through a catheter entered six and a half to eight inches. When the catheter is deflected laterally in passing, the side towards which the handle turns is probably the more enlarged. An examination should be made with a short beaked sound, such as that pictured in Holmes's system, vol. iv. p. 926; or one of those described and illustrated by Teevan in *Lancet*, vol. i, 1880. With this a possible calculus should be searched for. Stricture of Urethra contrasts with prostatic obstruction, in that (1) it occurs posteriorly to prostatic urethra, (2) it appears before middle life, (3) the stream of urine is more diminished in volume (in prostatic obstruction it is rather force than volume which is lessened.) Other conditions from which prostatic enlargement has to be distinguished (though it may co-exist with them) are *vesical calculus, tumor of* the bladder, atony of the bladder, paralysis of the bladder. Compare with the symptoms of these given under diseases of the bladder. *Treatment.*—A catheter should be passed twice a day, oftener where urination is extremely feeble. Patient should learn to catheterize himself. Elastic instruments preferable. Silver prostatic catheters are either made with a large curve or else with a short beak. Great irritability of the bladder, disturbing sleep, may require a vulcanized india-rubber catheter to be tied in at night. Treat coincidently such complications as catarrh of the bladder (*quod vide.*) Attend to the general health and regulate the habits. Clothe lower limbs warmly. Operations on diseased prostate are by most surgeons avoided.

PROSTATE, ATROPHY OF.—Unusual and unimportant.

PROSTATE, MALIGNANT DISEASE OF.—Encephaloid is the form which affects this gland. Occurs only in childhood and at advanced age. Progress very rapid in children. The spmptoms are the usual ones of cancer, added to those of prostatic obstruction, including, especially, severe pain, occasional hæmorrhages and cachexia. Lymphatic glands of lumbar, and sometimes of iliac region, enlarge. Urinary deposit may exhibit cancer cells when examined. *Treatment.*—If catheterism cannot be avoided, be as gentle as possible. Relieve pain by anodynes, &c. Treat hæmorrhage on general principles. Support the general strength. Perhaps Chian turpentine, which Clay appears to have found useful in carcinoma uteri, might be fairly tried here.

PROSTATE, TUBERCLE OF.—Very rare. Always secondary. Symptoms probably raise a suspicion of calculus; but no stone being found, and coincidence of symptoms of tuberble elsewhere, correct the diagnosis. Avoid instrumental interference; protect from other sources of irritation, and treat the tubercle and its results, *e.g.*, abscess, on general principles.

PROSTATE, CYSTS OF.—Small cysts sometimes occur. Often numerous, often contain small concretions. Probably dilatations of gland-tubules. No known symptoms of consequence; therefore no treatment.*—C. B. KEETLEY.

PRURIGO.—*Definition.*—Prurigo is a chronic papular disease of the skin accompanied by intense irritation.

Symptoms.—The severe form of this disease described by Hebra as seen on the Continent is happily very rare in this country, only one or two cases having been reported.

The milder conditions known in England are prurigo mitis, occurring among children, and the relapsing prurigo of Hutchinson. Inasmuch as the prurigo of Hebra has many peculiarities in which it differs from the disease we understand by the same name, a short resumé of Hebra's description will therefore first be noticed.

Prurigo of Hebra.—The eruption first appears in the shape of subepidermic papules of the size of hemp seeds; they are but slightly elevated above the surface, of the same color as normal skin, and are recognized more by the touch than the sight. They are always isolated, and may come out on all parts of the body, but, however severe, leave intervals of healthy skin. They are attended with intense itching which causes the patient to scratch, giving rise to excoriations of the surface and the formation of small blood crusts on their summits. After this has lasted for some time the whole of the skin affected becomes hard, brawny, and darker in color, owing to the deposit of pigment. As the disease progresses the normal furrows of the skin are seen to become deeper and farther apart; this is especially observable on the backs of the hands, the fingers, and the wrists. To the more severe form, which lasts the whole of life, the name of prurigo ferox is given. The parts most frequently attacked are the front and back of the chest, the whole of the back, loins, abdomen, and particularly the extensor surfaces of the limbs. The rash is less commonly present on the arms and thighs than on the forearms and legs, and, on the whole, more often attacks the lower than the upper extremities. Even in the most severe forms the flexor surfaces of the joints, the genitals, scalp and face escape. Frequently eczema is produced as the result of the irritation, and in consequence the lymphatic glands become enlarged. Although the disease is never absolutely cured, at times the symptoms are so mitigated that it appears to have disappeared. Weather apparently has some effect on its intensity, for it is always more severe in cold than in warm seasons. Prurigo is not congenital, but nearly always commences soon after birth.

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* The above account of diseases of the prostate is chiefly condensed from the writings of Sir Henry Thompson.

Prurigo Mitis.—Prurigo, as we understand it, as compared with the above disease, a simple malady. Although the objective symptoms in both varieties resemble each other, the English disease does not run such a protracted course as the German, and is, in fact, limited almost entirely to early life. The delicate skin of infants is usually in the first instance irritated by some local cause, such as flannel or the bites of parasites; as a result a papular eruption, together with some amount of urticaria, is developed, chiefly on the back and the extensor surfaces of the limbs. This is accompanied by severe itching, and when the child is old enough to scratch blood crusts are formed, which constitute an important characteristic of the disease. On passing the hand over the back the whole skin feels rough like a nutmeg grater.

Pruigo mitis usually occurs in delicate and badly-nourished children, and is certainly more common among the poor, probably owing to their being more exposed to the causes above mentioned. The disease does not usually last longer than a few years, and is rarely seen in persons above the age of ten years.

Mr. Hutchinson has recently paid considerable attention to the prurigo of infants, and has made several important and interesting observations on its causation. He points out that there is considerable difference in the appearances of the ordinary eruption, which depends on the size of the papules and the amount of urticaria accompanying them, in some cases the papules being "hard, rough, and dry, like a nutmeg grater, while in other cases they are of larger size, like half-developed wheals of urticaria, with perhaps even some tendency to vesication," and that there are besides two other distinct varieties to be distinguished. In one of these positive vesication takes place, and the palms and soles are affected. The history of the case leads to the belief that the child has in the first instance suffered from varicella. He states that it is not uncommon to find that the skin eruption commenced with a sudden outbreak of disease, which rapidly changed its character, and that, inasmuch as abortive varicella undoubtedly occurs, the first outbreak was probably due to this disease, which was not then recognized.

The ordinary prurigo eruption begins more gradually and varies in severity, being better in winter and worse in summer, and is due to the irritation produced by fleas or other parasites, which are more abundant in the warm than in the cold weather.

A pruriginous condition of the skin may, however, also be induced by varicella or vaccination, which is not developed until the skin is subsequently irritated by fleabites or some other local cause.

Prurigo may therefore be produced in one of three ways.

1st. By the local irritation of fleas, or by wearing flannel, etc.

2d. *By these local* causes acting on a skin which has been previously made susceptible to their influence by a previous attack of varicella or vaccination.

3d. By the direct irritation of varicella itself without the intervention of any other exciting cause.

Relapsing Prurigo.—This disease, first described by Hutchinson, differs from the other forms of prurigo, first, in the age at which it occurs, having a tendency to commence about puberty; and secondly, in the color of the papules, which are in this variety red. Together with the papular rash, which attacks most frequently the face, neck, and upper extremities, there is often an erythematous blush. Sometimes the rash leaves scars. Relapsing prurigo is attended with less itching than is the case in the other varieties, and does not produce the same hardness of skin as in Hebra's prurigo; its distribution is the same as in the latter, inasmuch as it never attacks the palms, soles, genitals, or flexures of the joints.

Diagnosis.—Prurigo may, under some circumstances, be mistaken for scabies, phthiriasis, eczema, urticaria, pruritus, and erythema.

From scabies it may be distinguished by the different sites of the two diseases. The presence of the rash on the genitals and on the flexures of the joints will serve to eliminate prurigo. If a burrow can be discovered and the acarus produced, the diagnosis is of course easily settled; besides, pustules and constant itching are points in favor of scabies.

From pediculosis it may be diagnosed by the absence of pediculi.

From eczema it is often difficult to distinguish it, especially when the two diseases are combined. The character of the skin near the eruption assists the diagnosis, the reddening which accompanies eczema being entirely absent in prurigo. The scattered eruption, the blood crusts, and the tendency of the papules to bleed in prurigo are points of difference from eczema.

From urticaria and pruritus it can be recognized by the absence of papules in these two diseases.

Prognosis.—The prognosis of Hebra's variety is unfavorable, and altnough the patient may live for years, his life is made utterly miserable by the intense itching. The prurigo of infants, due to a local cause, is curable when the cause is removed, but the duration of the disease is often protracted. The relapsing prurigo of Hutchinson is always a most obstinate form, lasting, in consequence of so many relapses, for years.

Treatment.—Beyond attempting to alleviate the patient's condition by attending to his general health and procuring sleep, nothing can be done to cure the variety described by Hebra. Since prurigo of children is often due to a local cause, this must be sought for and carefully removed; children, as a rule, outgrow prurigo, but considerable relief can be obtained from the use of tar baths, consisting of two or three or more teaspoonfuls of liquor carbonis detergens to a gallon of warm water. In such a bath the child should be kept for at least half an hour twice a day, and in the interval should be well anointed with a soothing ointment. For cachectic or strumous children cod-liver oil and steel wine should be prescribed. In the relapsing variety arsenic is of value.—MALCOLM MORRIS.

PRURITUS.—I shall limit myself to the consideration ot that functional derangement in which there is itching of greater or less intensity without originally any lesion of the skin appreciable to the naked eye. I shall not, therefore, include that exudative papular disease named prurigo, nor shall I, other than incidentally, treat of itching as a complication of affections of the skin proper. Let me here remark, that one example of progress made in the study of skin diseases is offered by the subject of this paper, which was at one time called both prurigo and pruritus; while now it is proved that there is a distinct morbid entity called prurigo, with severe symptoms and visible lesion, and it is also clearly settled that there is a functional disorder of the skin without any primary lesion of that tissue, due to various causes, the symptom of which is, in short, itching. Pruritus of the skin, or itching, then, is not a disease, a morbid entity, but a functional disorder of that tissue occurring under the most varied circumstances. It is of especial importance in every case of this affection that its cause be as far as possible accurately determined, for upon the conclusions thus obtained many of the therapeutic indications are based. Allow me, then, though I shall undoubtedly state facts well known to you, to sketch briefly the chief causes of pruritus, which I think can be arranged conveniently in the following manner:

1st. That itching which is caused by external agents, such as rough clothing, woolens (colored and otherwise), harsh friction, such as with towels, certain soaps and baths, and last, but not least important, certain parasites, chiefly animal, also vegetable.

2d. Pruritus from internal causes, such as Bright's disease; visceral diseases, such as gastro-intestinal and hepatic, and sometimes pulmonary; and malaria; also from plethora and from that condition of suboxidation which is frequently an accompaniment of the gouty and rheumatic state, but which may exist without such complication, as a morbid condition, in which the process of destructive metamorphosis of the tissues is imperfectly performed, and we find as a tangible evidence of it, besides the symptoms of which itching is very often a prominent one, a great excess of such solid matters of the urine as urea, uric acid, and oxalate of lime. Then we may mention diabetes as a not infrequent cause of pruritus, which also is observed in the course of various nervous disorders and tumors in the brain and cord.

3d. The pruritus which follows certain affections of the skin, themselves being attended most frequently with itching, and burning combined with itching. These are the various erythematous affections, urticaria, eczema, scabies, pediculosis, measles, scarlatina, sometimes small pox, and heat eruptions.

4th. We have pruritus, caused in great part by the structure or conformation and condition of the parts involved, such as pruritus valvulæ, pruritus ani, pruritus of scrotum, and femora-scrotal pruritus; these, though largely induced, as said, by the condition of the parts, may also be induced or caused, or at least perpetuated by various other causes.

5th. There is the pruritus of old persons, in which there may or may not be visible lesion of the skin: sometimes, however, there is well marked atrophy; also, that itching of certain parts which from its development every winter has been called by Duhring and Handschuh, pruritus hiemalis. Finally, certain drugs, notably opium, induce cutaneous pruritus.

The chief importance of these facts consists in the indications which they suggest for the treatment of internal conditions, as well as for the removal of the causes which are ascertained to be in operation. Let us then briefly run over these general facts before we come to a consideration of the topical remedies in general.

First, then, as to external agents we all know that many persons can not bear the application of flannel to the skin, and I have frequently cured severe pruritus by simply ordering gause cotton undershirts to be worn under flannel. The same may be caused by gloves and stockings, as many patients complain of great itching of the hands and feet from wearing these articles in woolen. One of the most severe cases of chapped hands seen by me during last winter, began as a pruritus, caused by an extra thick pair of woolen gloves. Blue and red woolen also have been observed to cause pruritus, which ceased when a white article was worn

Pruritus, mostly of an ephemeral character, however, has been known to be caused by the use of stimulant applications, and of soaps of a too caustic nature; also by the too vigorous use of ordinary soaps, particularly of such rough stimulating agents of the skin as flesh bruises, Turkish towels, etc. The scope of this paper does not permit a full consideration of the relation of parasites to itching, but to be moderately complete I must mention certain facts. Cases certainly come before us in which we are in great doubt as to whether the itching is caused by an insect or whether it is due to other causes. Thus it may be in a patient in whom the suspicion of lice would not usually be entertained, or again the lesions observed may not be well marked. These cases have often puzzled me, particularly in elderly people of the better class, especially where the itching has been rather generally distributed, for if it is localized, as for instance to the genitalia or anus, we have important aids to diagnosis. In these cases of more extensive pruritus, if the symptom is worse on the back, shoulders over the scapulæ and about the waist, where the clothes are drawn tight the suspicion of pediculi, is to say the least, well warranted. Further, the skin must be carefully examined, and then if we find minute pin-head sized blood crusts, with little or no surrounding hyperæmia, we have almost positive evidence of a parasitic cause. I mention these facts at the risk even of being tedious, as so much importance depends upon a correct diagnosis, and again, as in some cases, we fail to find the pediculus itself, though sought for long and patiently. Having ascertained that the cause is the parasite, the first indication is to attack his habitat, namely, the clothes, which will be required to be ironed, particularly at the seams, or in some cases it may be necessary that they shall be boiled. I always direct that perfectly clean underclothes shall be worn after the application of remedies to the body. Of course, I cannot here enter into the treatment of Bright's disease in its varied forms; suffice it to say, that in certain cases of more or less extensive pruritus, this condition of the system causes the cutaneous irritation, which is much relieved when the cause is reached by the various means which we use in that disease, and is further remedied by local applications. It is well, then, in cases of pruritus occurring in middle and advanced age, to look after the condition of the kidneys, especially if the cause of the symptoms is at all obscure and if any suspicion arises as to the presence of Bright's disease. The same general remarks in similar conditions apply to the search after hepatic disorder, malaria, phthisis, and chronic gastro-intestinal affections. I now call to mind a gentleman, who having a flatulent dyspepsia with acid eructations, had also pruritus of the trunk and thighs, which was much relieved when the condition of his digestive system was improved. I feel that I cannot lay too much stress upon that condition of the system in which pruritus is found in persons whose urine is of high specific gravity and heavily laden with those resulting products of suboxidation of the tissues, namely, uric acid and oxalate of lime, and again those in which there is an excess of urea, for among other well marked symptoms pruritus is often a very distressing one, involving either large portions of the cutaneous surface, the extremities most frequently, and also upon the trunk, and also localized to the scrotum, to the scroto-femoral angle, and also to the anus. This condition, I think, will be found to be present in many cases of pruritus of the anus and of the genitals. The same state of the urine is also observed in gout and rheumatism, which diseases are often accompanied by pruritus, which however, is, I think, usually localized as to the parts just mentioned, in rheumatism more frequently than in gout, in which often large territories of skin become pruritic, and constitute a very distressing complication. In such cases as these attention to the diet is of first importance, the amount of albuminous and starchy food ingested must be carefully regulated; in fact, the diet must be plain and easily digestible. Fresh air and exercise have also much influence, and such therapeutic remedies as mercurial cathartics must be frequently used. But of the greatest importance is the prolonged use of alkalies, which must be administered with care and judgment, as I have said, for long periods. In my experience the acetate, citrate, or bi-carbonate of potassa have proved of greater value than have the soda salts, and in a few exceptional cases I have had success, where other remedies have failed, by giving dilute nitric acid in doses of from ten to forty drops, largely diluted in water, half an hour after meals, followed by chlorate of potassa in doses of from ten to thirty grains an hour after the taking of the acid. The action of these remedies, which combined as I have indicated is sometimes strikingly beneficial, is probably by means of the oxygen which they supply to the blood and tissues, as shown in one particular by the notable decrease which takes place in the quantity of uric acid found in the urine.

The same general treatment, with care as to diet, exercise and fresh air is necessary for the plethoric state, as a remedy (of course, in part,) for the pruritus which may coexist with it. In this condition, the symptom pruritus generally involves large surfaces of skin; and in my experience, more particularly the flexor aspect of the limbs than the trunk, though sometimes, even not infrequently, it is limited to the genitalia and anus. Diabetes, as a cause of pruritus, is frequent, and is difficult to treat. I know of no work or monograph which considers as fully as the importance of the subject merits, of the pruritus which is secondary to preexisting lesions of the skin, and I shall not here have the opportunity of supplying the want. In cases of children afflicted with oft recurring urticaria, a pruritus may be developed, which will render their future life miserable; hence the importance of carefully seeking the cause and of removing it. In such subjects every external source of irritation must be removed, and especial care must be paid for a long period to the condition of the skin. In like manner we must be on our guard in cases of chronic urticaria in the adult. The same care must be paid to avoid irritation and to allay any pruritus which may follow the exanthemata, which it not infrequently does, though enough stress is not laid upon it by authors. Woolens must not be worn next to the skin, and any and every source of irritation must be avoided. In these cases, though the patients be young, errors of suboxidation may be found to complicate the pruritus, and they should be treated in the same manner and as actively as in the adult.

I once convinced myself that a severe and general pruritus in a child, recently convalescent of scarlatina, was due to the preexisting irritation of the skin by the exanthemata, aggravated by the impaired function of the kidneys, secondary to the same cause, and an appropriate treatment brought relief and cure. When I speak, further on, of the local measures necessary for the relief of pruritus, I shall mention that treatment which is curative for the pruritus which sometimes follows measles which involves much space, and is often intense in character. The pruritus which is observed in eczematous patients, in spots which have been the seat of the trouble, and also in parts never thus affected, requires especial attention. If all traces of the eczema are not removed, such as thickening and scaling, proper treatment must be continued until the parts appear normal. The general hygiene of the skin is in this condition especially necessary, and such underlying and often predisposing conditions as suboxidation, the rheumatic and gouty vice, malaria and plethora must be carefully sought for, and if found, sedulously treated. The pruritus which sometimes follows scabies is sometimes very distressing, and leads to the improper use of *too stimulating applications.* It is the duty of the physician to determine whether the itch insect has ceased to be the source of the trouble, and to use such general, local, and if necessary, as is sometimes the case, internal measures as will bring relief. I cannot insist too strongly on this point, as I bear vividly in mind the cases of a refined man and woman, husband and wife, who accidentally contracted scabies, which was soon cured, and followed by a general and most intense pruritus, chiefly due to the severity of the applications which they continued to use long after the exciting cause had ceased. This point is of importance to be remembered, not only in the treatment of scabies, but also in some cases of eczema and psoriasis; indeed, we cannot, I think, exercise too much judgment and caution in the use of stimulating applications to the skin. The pruritus of the anus, scrotum, vulva, genito-femoral angle are largely caused by the coaptation of the parts and by the moisture peculiar to them, but also other conditions may be in operation, such as I have already pointed out, and as part of the treatment remedies must be addressed to their removal. I shall now only mention again, gout, visceral disease, the condition of suboxidation and diabetes. While these secondary causes are important, remedies addressed to their removal alone are not curative, and it is to these local spots of pruritus that topical remedies are most necessary and useful. The pruritus of old persons is often unattended with any deviation from health, which is recognizable, and hence is a condition difficult to treat intelligently, other than by topical means. In some cases we find a well marked atrophy of the skin. This tissue is then pale, thin, rather harsh and slightly scaly, and is the seat to a greater or less extent of itching, which is often very severe, particularly at night. This feature of nocturnal exacerbation is not peculiar to any form of pruritus, either accompanied or not by any lesion of the skin. In old persons, however, the rule is that the suffering is very severe and much worse at night than in the day time. As very little can be done, in the matter of internal treatment, for the winter pruritus or pruritus hiemalis, I shall say nothing of it here and only allude to it incidentally a little later on, when speaking of external treatment.

Such then, is a brief review of the indications for internal treatment, and for the prophylaxis of that distressing functional affection of the skin, which, I repeat, we do not consider as a distinct disease, but rather a disorder. Let us now rapidly study the topical treatment which has proved most useful in the various forms of pruritus. Of course, the mode of our applications varies very much according as the itching is extensive or limited in its distribution, and according to the conformation of the parts. Where the trunk and extremities are involved, baths are of great benefit, not only for their direct, sedative effect upon the nerves of the skin, but also from their similar influence on the large nervous centres and the circulation. Warm water of various degrees is a direct sedative to the skin, and a further soothing influence may be gained by the addition of the mucilaginous portions of bran or of starch. To this, also, alkalies, sal soda or borax may be often added with benefit.

Attention must be paid to the sensations of the patient, and also that when his flesh is dried it is not roughly rubbed, but rather carefully dried by slight pressure of the towel, which must be soft. I have known instances in which proper care not being used in administering the bath for pruritus, the reaction was so excessive that the sufferings of the patient were increased. As a sedative to the skin, applicable by means of a general bath, I know of no agent as good or certainly none better than the sulphuret of potassa, the only contra-indication to which is, its bad odor. Two to four ounces of this salt with one or two pounds of borax or sal soda, dissolved in thirty gallons of water, will form a bath suitable for severe and extensive cases of pruritus. This must be repeated generally at night, every day or every second day. It is always, in my judgment, well for the patient to lie down and rest, with moderate covering over him after a bath, as exercise afterwards is followed by an aggravation of the symptoms. My practice is, that after the bath, the skin shall be well anointed, and I have used and can recommend, the following remedies:

℞ Glycerin	℥ iv.
Acid. carbol.	ʒ i.
Ext. bellad.	gr. xx.
Aq.	℥ ss.

M.

This must be well but carefully rubbed in the skin until it has a soft, unctuous feel. Then again, equal parts of vaseline and glycerine with one drachm of carbolic acid to each four ounces of the ointment is sometimes productive of great relief. Indeed, I think that oftentimes the simple inunction of a pure oil, such as almond or olive oil, until the skin is quite greasy, is all that will be required after the bath. Not only should this inunction be used once daily after the bath, but also several times during the day, taking care that two much friction is not used. In the pruritus of old persons, especially with atrophic skin, this treatment is valuable, and is further beneficial in nearly all cases of extensive development. Some difficulty is always experienced in cases of extensive trouble in adapting the remedy, and in its application; but it can be overcome by patience and care. In the pruritus of old persons, also in that following pediculi, and again in public practice in general, I have used largely and generally with marked benefit, so that it has become to me a standard formula, the following preparation of carbolic acid, which drug I have come to regard as one of the most valuable agents for allaying cutaneous hyperaesthesia, which we possess:

℞ Acid. carbol.	ʒ ii to ʒ iv.
Glycerin.	℥ ii.
Aq.	℥ vi.

M.

This is carefully sopped on the itching surface, until it is quite soft and unctuous. Again, there are cases in which fatty matters are useful, combined with carbolic acid. Such prescriptions as follow have proved more or less efficacious in my hands:

℞ Vaseline,	
Ung. simplicis aa,	℥ ii.
Acid. carbol.	ʒ iss.

M.

This must be well, but gently, rubbed in. Then again, I have derived benefit from a mixture of equal parts of vaseline and glycerine; indeed, it is sometimes wonderful how much relief is obtained by these simple fatty inunctions. I should especially recommend that you bear them in mind to be used alone or following the bath, either plain or medicated.

I may further add that I have reason to regard the sulphuret of potassa as an agent worthy of trial in the form of a lotion, and would suggest the following prescription:

℞ Sulphuret potassæ,	ʒ iii.
Spts. camphor.	℥ ss.
Glycerin	℥ i.
Aq. q.s. ad	℥ vi.

M.

This may be gently applied to the itching surface and perhaps kept in coaptation by means of layers of lint saturated with it. The next important agent, indeed one of our most valuable for the relief of itching in *almost any form, is tar* and its preparations. For large surfaces in those cases in which ointments may be for any reason not useful, we can apply it as a lotion by using the French liquid called Goudron de Guyot, diluted with water, to which, according to my preference, about one-eighth part of glycerine has been added.

This Goudron de Guyot is an alkaline solution of tar, readily miscible with water, without turbidity. I have used it as strong as one ounce to seven of glycerine and water, and even as strong as two ounces to the same quantity. This makes an admirable lotion, which can be freely and continuously applied to the parts. For severe cases it is necessary to repeat the application several times daily, and to supplement its use by that of the bath. If applied without glycerine, the skin becomes after a time, hard and tense, and the sufferings are increased. I always, when using this or any preparation of tar for a length of time, advise one or two inunctions with one of the oily mixtures already spoken of. Another very excellent preparation of tar, which possesses the great advantage of mixing with water in any quantity, is called by its inventor, Dr. Bulkley, liquor picis alkalinus. Being more concentrated and more alkaline than the French preparation, it is to be preferred in general. Its formula is:

℞	Picis liquidæ	ʒ ii.
	Potassæ causticæ	ʒ i.
	Aq. destillat.	ʒ v.

M., and strain.

This must certainly, in pruritus, always be diluted, and I have used it in proportions of from two drachms to half an ounce to eight ounces of water. As an anti-pruritic of tar and potash, it is, to my mind, very valuable, and can be relied upon in a vast number of cases to relieve this distressing symptom. Its ready miscibility is also a great desideratum. This lotion, also mixed with glycerine, may be used on large and small surfaces, in combination with baths and inunctions, as the case requires. Further than this preparation of tar we have oil of tar, oil of cade, and oil of white birch or oleum betulla alba or oil Rusci. These can only be used in the form of ointment or mixed with glycerine and vaseline. The proportion most useful in my experience is one drachm of tarry oil to the ounce of fatty substance. The fatty substance may vary; thus you will sometimes find it advantageous to use the ointment of ozide of zinc, also an ointment composed of precipitated chalk, one drachm; simple cerate, one ounce; or you may order the sub-nitrate of bismuth instead of the chalk. This combination mixed with one of the tarry oils in the proportion mentioned, will, sometimes, indeed often, be of great service, not only in pruritus, but in cases in which this symptom is present with a well marked affection of the skin. Experience has shown that camphor possesses antipruritic powers of no light order. It may be variously used. In certain simple cases of itching, the ordinary camphor water answers a good purpose, particularly in children. It may be used as an ointment in the proportion of from one half to one drachm to the ounce, or it may be added to either of the above mentioned tarry ointments. The spirits of camphor in a mixture such as follows, is often of great value:

℞	Spts. camph.	℥ ss.
	Boracis	ʒ ii.
	Aq.	℥ vi.
	Glycerin	℥ ii.

M.

Care must always be taken that the mixture is well shaken. Though not extensively used iodoform has proved to be an antipruritic of some value. It may be used as an ointment in the proportion of one drachm to the ounce; and also as a lotion, which by the way, has been of marked benefit in my hands in pruritus of the vulva and of the anus. The formula is:

℞	Iodoform	ʒ i.
	Ether. sulphuric	ʒ ii.
	Glycerin	℥ i.

M.

The iodoform must be finely powdered. The parts are to be well moistened with this lotion and then covered with a layer of lint, wet in cold water. Perhaps, in certain cases of extensive pruritus, this lotion may prove of equal value. I need not enter fully into a further consideration of this agent. Within a few years, a combination of camphor and chloral has been much used, and with benefit, as an antipruritic. The preparation is formed by the addition of about an equal amount of chloral to a given quantity of finely powdered camphor; the result is a syrupy liquid of pungent smell and taste, which, undiluted, has proved of great benefit in severe neuralgia, and even in certain extreme cases of pruritus. As a rule, it is well to use it in the proportion of from one to three drachms to the ounce of glycerine, vaseline, or cold cream, and then gently rubbed several times a day upon the itchy parts. It can also be diluted with water and glycerine, and then forms a most valuable antipruritic lotion, as follows:

℞	Chloral camphor	℥ ss.
	Glycerin	℥ iss.
	Aq.	℥ vi.

M.

This may be applied to the parts, and also on lint. Then we must bear in mind the ethers, namely: sulphuric ether, chloric ether and chloroform, as they sometimes succeed where other agents fail. They may be used either in the form of ointment or of lotion, which may be made best of glycerine and water. These agents are sometimes of benefit, in a dilute state, in pruritus vulvæ and ani. Let us not fail to mention the dilute hydrocyanic acid in a solution of borax or combined with camphor, as an excellent remedy for certain mild forms of pruritus:

℞	Acid hydrocyanic dil.	ʒ ss. to ʒ i.
	Spts. camphor	ʒ ii. to ℥ ss.
	Glycerin	℥ i.
	Aq.	℥ iii.

M.

Sub-nitrate of bismuth or calamine, or precipitated chalk, in the proportion of two drachms to the four ounces of the foregoing mixture, may often be added with benefit. Then again cyanide of potassium may be useful, in cases of limited extent, used with caution and generally not stronger than one drachm to four ounces of water. In cases of limited extent the old black wash is often very beneficial, and it has in my experience often cured severe instances of intertrigo. It is well in a condition which we treat to some extent empirically to bear in mind all remedies which have done good, so I shall not fail to mention vinegar, a domestic remedy of some repute, used pure or diluted, or the fluid extract of hammamelis or witch hazel, which I believe, being introduced by our homœopathic brethren, has become a household remedy and is especially well thought of by the laity for itching of the skin and for burns and scalds. Pure water also may prove useful. I have had in some cases of extensive, and in many of limited pruritus, marked results from the following prescription, which relieved when camphor and tarry preparations aggravated.

℞	Fol. belladonnæ	
	Fol. hyoscyami	aa. ℥ ii.
	Fol. aconiti	℥ i.
	Acid acetic	℥ viii.

M.

The leaves must be reduced to a tolerably fine powder and then mixed with the acid and allowed to macerate two weeks. When ready it forms a heavy dark colored liquid of pungent smell. Of this, two fluid drachms to the gill of water makes a very efficacious antipruritic, and a greater strength even may be used. I have sometimes seen the power of this lotion increased by the addition of two drachms more of acetic acid. In some severe cases of pruritus vulvæ and ani I have seen relief obtained by painting the parts, previously well washed, with a mixture of equal parts of this combination and glycerine. This may be done twice a day, and in the meantime an ointment composed of one drachm of the same combination and one ounce of simple cerate may be applied on lint. I shall merely mention, to render my list as complete as possible, the extracts of belladonna and of aconite, tincture of aconite, aconitine and veratrine, the directions for the use of which in various forms are given in the text books. In the same class we have the preparations of opium, of which I sometimes use morphine in solution, at others a solution of the watery extract of opium. These agents however rarely answer well alone, but are useful at times as adjuvants. It may appear unnecessary, but my faith in its effects prompts me to mention particularly, the old lead and opium wash, which modified as follows, is oftentimes of service as a cutaneous application:

℞	Tr. opii	℥ i.
	Spts. camphor	℥ ss.
	Liq. plumbi subacet.	ʒ i.
	Glycerinæ	℥ iss.
	Aq. q. s. ad	℥ vii.

M.

To be applied continuously on lint. If to this we add half an ounce of the subnitrate of bismuth we have one of the most reliable and efficacious lotions for that common affection of hot weather, prickly heat, which I have ever used, and I speak feelingly. It may be well to mention general tan baths as being indicated in some cases, and the infusion of quassia as a lotion well spoken of by some writers.

I have been struck with the great relief often produced by preparations of the oils of peppermint or spearmint. They often relieve itching instantly and induce a delightfnl sensation of coolness. It is not well to use the oils in a pure state but rather the essences variously diluted with water. In severe cases equal parts of essences of peppermint and glycerine are very efficacious painted on the parts with a camel's hair pencil. The oils may be used in the form of ointment in the proportion of from half to one drachm to the ounce of simple cerate.

There are several anti-pruritic powders which are sometimes indispensable. The most important is that which is commonly called Anderson's powder. It is formed as follows:

℞	Pulv. amyli	℥ i.
	Pulv. camph	ʒ iss.
	Zinci oxid	℥ ss.

M.

This must be carefully made, the camphor being reduced to an impalpable powder and then throughly incorporated with the other ingredients. It may be either lightly dusted upon the parts, or it may be quite copiously rubbed into the meshes of linen lint and then applied. The proportions may be altered either by increase or diminution. Then there are rice powders, lycopodium, subnitrate of bismuth, calamine, and prepared chalk.

It now remains for me to treat briefly of the pruritus of the vulva and of the anus. Space will not admit of a consideration here of the necessities for treatment of the parts in anatomical connection with these regions, and such is unnecessary as the subject of pruritus vulvæ is treated of in the most thorough and most graphic manner in Dr. Thomas' classical work on diseases of women; and as all surgeons in their work speak of the rectal affections often coexistent with pruritus ani. To begin with the pruritus of the vulvae, injections into the vulva are generally indispensable. Infusion of tobacco injected very warm and copiously, is spoken of by many, and Dr. Butt of Alabama recently stated that he derived benefit, where all other remedies had failed, by using a hot tar tansy poultice. Copious injections of hot water followed by the application of linen cloths, wrung out in hot water, are also worthy of mention, while we have the authority of Dr. Gill, of St. Louis, for the use of nitrate of alumina, five to ten grains to the ounce of water, as a vaginal injection. In my own practice I have seen marked benefit from the use alternately of very hot and very cold water, followed by the continuous application of lead and opium wash. Alkaline injections, of course very hot, made by adding either sal soda or borax, are of frequent service, and very dilute solutions of Goulard's extract are excellent as vaginal injections. It may be necessary in some of these cases to tampon the vagina, as such has been known to do good; in any case, I think it is absolutely necessary to keep the lips of the vulvæ separated by means of a folded piece of soft linen or of linen lint. Of course, any secretion from above must be traced to its origin and looked after; the urine must be carefully examined and the condition of the rectum noted. Any abnormality requires treatment as imperatively as does the vulval symptom. I shall here merely allude to the various remedies already considered and mention a few which are particularly applicable. First, let me say, that in cases of vulval pruritus, ointments and fatty preparations are harmful, and that generally aqueous ones and liquids do good. The solution of cyanide of potassium, or the hydrocyanic acid combination have been used with success, as has also the lead and opium wash, with or without camphor and black wash. Dr. Thomas gives the following very useful formula, the chief agent of which is corrosive sublimate, which as a solution with various adjuncts has been extensively used as an antipruritic:

℞ Hyd. bichloridi.. ʒ ss.
Tr. opii.. ℥ ss.
Aquæ .... ℥ vii.
M.

This should be sopped on the parts freely and then kept continuously applied on lint. I have used this salt in various forms for pruritus, and have come to regard it as of benefit quite frequently. It must always be used cautiously, especially on a surface of some size. Solutions of nitrate of silver deserve especial mention, applied in various strengths, sometimes particularly in old cases with much thickening of the mucous membrane as strong as from one half, to a drachm and a half, to the ounce of water. The parts are to be painted carefully and then kept apart by lint soaked in water or any lotion used rather less frequently. But still of great value if judiciously and well applied are of caustic potassa and soda of strengths similar to those of nitrate of silver.

These are generally indicated in old cases with much mucous membrane hypertrophy. When this latter condition exists, it is fair to say that the itching will continue as long as it is not especially treated, and that the symptoms will generally be relieved in proportion as the thickening grows less.

Suppositories either rectal or vaginal may be remembered, for which we have numberless ingredients, some of which I have mentioned. My friend Dr. F. Leroy Satterlee has used with more than ordinary benefit as a local application by means of a brush, the fluid extract of conium. This drug is to my mind capable of extensive application either in the form of an infusion used after the manner of the tobacco preparation, of an ointment made o. the solid extract, or in the form of the fluid extract of which Dr. Satterlee speaks so confidently. It occurs to me that perhaps the preparation of which I have already given the formula, being composed of acetic acid, belladonna, leaves, et cet., may be rendered more efficacious by the addition of conium. Certainly this narcotic vinegar can be used with good results in vulval pruritus, both largely diluted as a vaginal injection and of greater strength for continuous application. As a curiosity I may mention the astonishing cure of an aggravated case of pruritus vulvæ, occurring during pregnancy, in which upon two occasions instantaneous and prolonged relief followed the smoking of a cigar. The full details of the case are to be found in Dr. Thomas' work. I need not mention all of the various ointments which have been used and found to be of more or less ephemeral effect, except to say, that it is sometimes well to try certain of those in which a mercurial salt is an ingredient, notably diluted citrine ointment, and a mild calomel ointment. It is well, also, to remember prominently carbolic acid and iodoform as being often useful. As a rule, tarry applications are harmful, but the chloral camphor combination, diluted, has been known to do good. Much relief, if even temporary, may be produced by spraying the parts, for which purpose a slightly stimulating and anodyne solution is indicated. This procedure may be used also in cases of pruritus ani, and the idea suggests itself that to spray many large itching surfaces with other preparations may also be worthy of a trial. I have not thus far mentioned iodine, as its use is restricted to small spots, and it may be used in the cases under consideration in various forms. The older writers speak well of yellow wash, therefore it is well to place it in our repertorium. Many of the remedies useful in pruritus of the vulva are also of service in itching of the anus. In treating this distressing symptom not only must the general condition of the patient be looked after, but care must be taken to ascertain the state of the rectum and parts surrounding. Any lesion of the anus and rectum must be especially treated. The various lotions, ointments, and applications previously spoken of may be tried. I may mention as deserving of praise the salve called by Bryant unguentum metallorum, composed of equal parts of oxide of zinc ointment, citrine ointment, and lead ointment. Tarry applications may be of benefit, especially if combined with powdered nutgalls. Injections into the rectum, simple or medicated, may also give relief, while for occasional use suppositories may be borne in mind. Much benefit often follows the application to the anus of a sponge wrung out in very cold water. I may also especially mention iodoform and carbolic acid, which singly or combined form a valuable application if incorporated with the officinal lead ointment in varying strength, as the cases suggest. Many more formulæ might be given, but I think that if some of those already enumerated are judiciously used, relief will be obtained.—R. W. TAYLOR.

PSOAS, Lumbar, and Other Abscesses Connected with Spine. —*See Spinal Caries ; also Abscess, Chronic.*

PSORIASIS VULGARIS.—*Definition.*—Psoriasis is a chronic disease of the skin, characterized by the production of white silvery scales on hyperæmic bases.

Symptoms.—The eruption begins with congestion of the papillæ of the skin, giving rise to an increased production of epidermic cells in the form of a quantity of minute elevations, which increase in size, and are separated from each other by healthy skin. When these are of the size of pins' heads, the name psoriasis punctata is given to the eruption; as they develop they have the appearance of drops of mortar, and it is then known as psoriasis guttata ; a further increase by growth of the periphery brings them to the size of coins, when the rash is described as psoriasis nummularis. While the patches first formed in this way develop in size, others are continually beginning, until patches of all sizes are to be seen. These patches of diseased skin have a tendency to heal in their centres, while extension takes place at their margins, and as a result rings are formed, the circumferences of which vary in thickness according to the size of the patches, since the healing process in the centre takes place more rapidly than the growth at the margins. To this variety the name of psoriasis circinata or lepra is usually given. Frequently two rings come in contact with each other at the edges, thus forming the figure 8; or three rings will meet, producing a trefoil. Often, however, the circles are not complete, and as a result a quantity of wavy lines are formed. This variety is known as psoriasis gyrata or figurata. The rings never overlap each other, each presenting an impenetrable barrier to the extension of contiguous rings. The name of psoriasis universalis is given to the eruption when the patches increase in size, coalesce, and cover the whole of the body. This is very rarely met with, and even when it does occur a considerable portion of healthy skin remains unattacked and intervenes between the diseased patches. When the thickening of the skin and the growth of epidermic cells is very marked, the eruption is called psoriasis inveterata. A further form has been described by McCall Anderson under the name of psoriasis rupioides, owing to the special prominence of the patches, which are usually larger than in psoriasis guttata. "The accumulation of the epidermis takes place to an unusual extent, so that on many of the patches it assumes the shape of large conical crusts marked by concentric rings." When the crusts are removed no ulceration remains, but "a slightly elevated dusky-red surface is exposed to view, which sometimes bleeds a very little."

Although when psoriasis first appears there is little discoloration of the skin, it soon becomes raised and of a marked red color, which as time goes on grows darker. At a later stage the scales are shed, leaving the red patches still raised but bare. At a further period, when the disease commences to heal, the patch becomes less and less elevated, and the color lighter and lighter, till eventually the eruption fades, leaving the skin perfectly normal and not stained with pigment.

Psoriasis, as a rule, is attended by some amount of local irritation, and the scratching which results leads to the formation of small blood crusts. Hebra has pointed out that these will always be found on the edge of the patch as well as in its centre, and states that the older patches only itch at their margins, and concludes therefore that the itching only occurs while the eruption is growing.

Psoriasis may occur on any part of the body, but the tips of the elbows, the fronts of the knees, and the head are especially liable to be affected. It may be limited to the knees and elbows without attacking other parts, but if the rest of the body is implicated these regions are but rarely exempt. When the head is attacked, the eruption extends beyond the part covered with hair and forms a ring round the forehead and ears. Often the disease penetrates into the meatus of the ear, and thus produces deafness. Psoriasis is never seen on the mucous membranes or the red margins of lips, and but rarely on the palms and soles. The nails are sometimes subjected to the action of the disease, and then become thick, friable, and of a brown color.

Psoriasis of the scalp produces no change either in the color or structure of the hair, although it causes it to be shed more freely than is naturally the case.

Although much difference of opinion exists regarding the conditions that lead to the production of psoriasis, there is no reason for believing that climate. habits of life, special occupations, exposure to cold, uncleanliness, diathesis, temperament, pregnancy, mental emotion, syphilis, gout or other diseases, or even sex, race, or age, have any influence on its origin. It is undoubtedly hereditary, and it is comparatively rare to find psoriasis in one member of a family without finding it in another.

Diagnosis.—Psoriasis may be confounded with seven diseases: 1. Squamous syphilide. 2. Lichen ruber. 3. Eczema squamosum. 4. Pityriasis rubra. 5. Pityriasis can be distinguished from psoriasis by the contrast of the thick white scales of the latter with the thin dark scales of the former, and by the absence of thickening of the skin in pityriasis. 6. Ichthyosis is readily recognized by the absence of the redness of the skin and the white silverlike scales pecular to psoriasis, and by the fact of the disease affecting the whole surface and being congenital. 7. Tinea circinata occasionally bears a rough resemblance to psoriasis, but it does not attack the knees and elbows, its scales are not silvery, and microscopic examination will enable the parasite to be distinguished.

Prognosis.—Psoriasis is not a fatal disease, but is exceedingly obstinate, though to some extent amenable to treatment, and it is liable to relapse.

Treatment.—The treatment of psoriasis consists in the use of constitutional and local remedies. Of the constitutional remedies, no drug has proved of such service as arsenic, which should be given in increasing doses until the eruption begins to disappear, and then continued in small quantities for a great length of time.

The alkaline treatment has been said to be attended with success, but it is of doubtful value. It is given in the form of liquor potassæ, in doses of twenty or thirty drops, three times daily. McCall Anderson has seen much benefit derived from the use of carbonate of ammonia, which should be given in doses increasing from ten to forty grains.

The internal administration of tar is also stated to be beneficial when other remedies fail, but it is by no means a drug to be relied upon.

The local treatment of psoriasis is most important, but though the employment of it without any internal remedy does remove the external appearance of the disease, a real cure is not effected on account of its liability to return. Both modes of treatment should, therefore, be adopted at the same time, and the internal should be continued for a considerable period after the apparent cure.

When the inflammation is excessive, the continuous application of cold water is of great benefit in removing the scales and limiting their production.

This may be carried out by means of baths or by local cold packing; the former should be done thoroughly by immersion of the whole body or one limb for many hours at a time.

Before applying local remedies, it is necessary first to endeavor to remove the scales. This is best carried out by means of soft soap, and so effectual is this plan sometimes that no further application is required.

Of local remedies those of a stimulating character are the most suitable, such as preparations of tar. The huile de cade, or common tar itself, or better still the liquor carbonis detergens, ought to be tried, but no drug has proved so successful in such a large proportion of cases as chrysophanic acid, which may be used in the form of an ointment, consisting of ten to thirty grains of the acid to one ounce of vaseline or lard. Chrysophanic acid is the active principle of Goa powder, the Indian remedy for ringworm, and was first recommended in psoriasis by Mr. Balmanno Squire. The chief objection to this drug is the amount of irritation it produces, not so much in the patch to which it has been applied, but in the neighboring skin. Sometimes this irritation is very severe, when the use of the remedy should be immediately suspended.—MALCOLM MORRIS.

PTERYGIUM—*See Conjunctiva, Diseases of.*

PTOSIS—*See Eyelids, Diseases of.*

PTYALISM—*See Salivation.*

PUERPERAL CONVULSIONS.—*Puerperal Eclampsia.*—By the term puerperal eclampsia is meant a peculiar kind of epileptiform convulsions, which may occur in the latter months of pregnancy, or during or after parturition, and it constitutes one of the most formidable diseases with which the obstetrician has to cope. The attack is often so sudden and unexpected, so terrible in its nature, and attended with such serious danger both to the mother and child, that the disease has attracted much attention.

Its Doubtful Etiology.—The researches of Lever, Braun, Frerichs, and many other writers who have shown the frequent association of eclampsia with albuminuria, have of late years been supposed to clear up to a great extent the etiology of the disease, and to prove its dependence on the retention of urinary elements in the blood. While the urinary origin of eclampsia has been pretty generally accepted, more recent observations have tended to throw doubt on its essential dependence on this cause; so that it can hardly be said that we are yet in a position to explain its true pathology with certainty. These points will require separate discussion, but it is first necessary to describe the character and history of the attack.

Confusion from Including Distinct Diseases under the Same Name.—Considerable confusion exists in the description of puerperal convulsions from the confounding of several essentially distinct diseases under the same name. Thus, in most obstetric works it has been customary to describe three distinct classes of convulsion; the epileptic, the hysterical, and the apoplectic. The two latter, however, come under a totally different category. A pregnant woman may suffer from hysterical paroxysms, or she may be attacked with apoplexy, accompanied with coma, and followed by paralysis. But these conditions in the pregnant or parturient women are identical with the same diseases in the non-pregnant, and are no way special in their nature. True eclampsia, however, is different in its clinical history from epilepsy; although the paroxysms, while they last, are essentially the same as those of an ordinary epileptic fit.

Premonitory Symptoms.—An attack of eclampsia seldom occurs without having been preceded by certain more or less well-marked precursory symptoms. It is true that, in a considerable number of cases, these are so slight as not to attract attention, and suspicion is not aroused until the patient is seized with convulsions. Still, subsequent investigations will very generally show that some symptoms did exist, which, if observed and properly interpreted, might have put the practitioner on his guard, and possibly enabled him to ward off the attack. Hence a knowledge of them is of real practical value. The most common are associated with the cerebrum, such as severe headache, which is the one most generally observed, and is sometimes limited to one side of the head. Transient attacks of dizziness, spots before the eyes, loss of sight, or impairment of the intellectual faculties, are also not uncommon. These signs in a pregnant woman are of the gravest import, and should at once call for investigation into the nature of the case. Less marked indications sometimes exist in the form of irritability, slight headache or stupor, and a general feeling of indisposition. Another important premonitory sign is œdema of the subcutaneous cellular tissue, especially of the face or upper extremities, which should at once lead to an examination of the urine.

Symptoms of the Attack.—Whether such indications have preceded an attack or not, as soon as the convulsion comes on there can no longer be any doubt as to the nature of the case. The attack is generally sudden in its onset, and in its character is precisely that of a severe epileptic fit, or of the convulsions in children. There is first a clonic convulsion, almost immediately succeeded by clonic spasms. Close observation shows that there is at first a short period of tonic spasm, affecting the entire muscular system. This is almost immediately succeeded by violent clonic contractions, generally commencing in the muscles of the face, which twitch violently; the expression is horribly altered; the globes of the eyes are turned up under the eyelids, so as to leave only the white sclerotics visible, and the angles of the mouth are retracted and fixed in a convulsive grin. The tongue is at the same time protruded forcibly, and, if care be not taken, is apt to be lacerated by the violent grinding of the teeth. The face, at first pale, soon becomes livid and cyanosed, while the veins of the neck are distended, and the carotids beat vigorously. Frothy saliva collects about the mouth, and the whole appearance is so changed as to render the patient quite unrecognizable. The convulsive movements soon attack the muscles of the body. The hands and arms, at first rigidly fixed, with the thumbs clenched into the palms, begin to jerk, and the whole muscular system is thrown into rapidly recurring convulsive spasms. It is evident that the involuntary muscles are implicated in the convulsive action, as well as the voluntary. This is shown by a temporary arrest of respiration at the commencement of the attack, followed by irregular and hurried respiratory movements, producing a peculiar hissing sound. The occasional involuntary expulsion of urine and feces indicates the same fact. During the attack the patient is absolutely unconscious, sensibility is totally suspended, and she has afterwards no recollection of what has taken place. Fortunately the convulsion is not of long duration, and, at the outside, does not last more than three or four minutes, generally not so long. In most cases, after an interval, there is a recurrence of the convulsion, characterized by the same phenomena, and the paroxysms are repeated with more or less force and frequency, according to the severity of the attack. The paroxysms occur with varying frequency. Sometimes several hours may elapse before a second convulsion comes on; at others the attacks may recur very often, with only a few minutes between them. In the slighter forms of eclampsia there may not be more than two or three paroxysms in all; in the more serious as many as fifty or sixty have been recorded.

Condition between the Attacks.—After the first attack the patient generally soon recovers her consciousness, being somewhat dazed and somnolent, with no clear perception of what has occurred. If the paroxysms be frequently repeated, more or less profound coma continued in the intervals between them, which, no doubt, depends upon intense cerebral congestion, resulting from the interference with the circulation in the great veins of the neck, produced by spasmodic contraction of the muscles. The coma is rarely complete, the patient showing signs of sensibility when irritated, and groaning during the uterine contractions. In the worst class of cases, the torpor may become intense and continuous, and in this state the patient may die. When the convulsions have entirely stopped, and the patient has completely regained her consciousness, and is apparently convalescent, recollection of what has taken place during, and some time before, the attack, may be entirely lost, and this condition may last for a considerable time. A curious instance of this came under my notice in a lady who had lost a brother, to whom she was greatly attached, in the week immediately preceding her confinement, and in whom the mental distress seemed to have had a great deal to do in determining the attack. It was many weeks before she recovered her memory, and during that time she recollected nothing about the circumstances connected with her brother's death, the whole of that week being, as it were, blotted out of her recollection.

Relation of the Attacks to Labor.—If the convulsions come on during pregnancy, we may look upon the advent of labor as almost a certainty; and if we consider the severe nervous shock and general disturbance, this is the result we might reasonably anticipate. If they occur, as is not uncommon, for the first time during labor, the pains generally continue with increased force and frequency, since the uterus partakes of the convulsive action. It has not rarely happened that the pains have gone on with such intensity that the child has been born quite unexpectedly, the attention of the practitioner being taken up with the patient. In many cases the advent of fresh paroxysms is associated with the commencement of a pain, the irritation of which seems sufficient to bring on the convulsion.

Results to the Mother and Child.—The results of eclampsia vary according to the severity of the paroxysms. It is generally said that about one in three or four cases dies. The mortality has certainly lessened of late years, probably in consequence of improved knowledge of the nature of the disease, and more rational modes of treatment. This is well shown by Barker,* who found in 1855 a mortality of 32 per cent. in cases occurring before and during labor, and 22 per cent. in those after labor; while since that date the mortality has fallen to 14 per cent. The same conclusion is arrived at by Dr. Phillips,† who has shown that the mortality has greatly lessened since the practice of repeated and indiscriminate bleeding, long considered the sheet anchor in the disease, has been discontinued, and the administration of chloroform substituted.

Cause of Death.—Death may occur during the paroxysm, and then it may be due to the long continuance of the tonic spasm producing asphyxia. It is certain that, as long as the tonic spasm lasts, the respiration is suspended, just as in the convulsive disease of children known as laryngismus stridulus; and it is possible also that the heart may share in the convulsive contraction which is known to affect other involuntary muscles. More frequently, death happens at a later period, from the combined effects of exhaustion and asphyxia. The records of post-mortem examinations are not numerous; in those we possess the principal changes have been an anæmic condition of the brain, with some œdematous infiltration. In a few rare cases the convulsions have resulted in effusion of blood into ventricles, or on the base of the brain. The prognosis as regards the child is also serious. Out of 36 children, Hall Davis found 26 born alive, 10 being still born. There is good reason to believe that the convulsion may attack the child *in utero;* of this several examples are mentioned by Cazeaux; or it may be subsequently attacked with convulsions, even when apparently healthy at birth.

Pathology of the Disease.—The precise pathology of eclampsia cannot be considered by any means satisfactorily settled. When, in the year 1843, Lever first showed that the urine in patients suffering from puerperal convulsions was generally highly charged with albumen—a fact which subsequent experience has amply confirmed, it was thought that a key to the etiology of the disease had been found. It was known that chronic forms of Bright's disease were frequently associated with retention of urinary elements in the blood, and not rarely accompanied by convulsions.

Uræmic Theory of Its Origin.—The natural inference was drawn, that the convulsions of eclampsia were also due to toxæmia resulting from the retention of urea in the blood, just as in the uræmia of chronic Bright's disease; and this view was adopted and supported by the authority of Braun, Frerichs, and many other writers of eminence, and was pretty generally received as a satisfactory explanation of the facts. Frerichs modfied it so far, that he held that the true toxic element was not urea as such, but carbonate of ammonia, resulting from its decomposition; and experiments were made to prove that the injection of this substance into the veins of the lower animals produced convulsions of precisely the same character as eclampsia. Dr. Hammond,* of Maryland, subsequently made a series of counter experiments, which were held as proving that there was no reason to believe that urea ever did become decomposed in the blood in the way that Frerichs supposed, or that the symptoms of uræmia were ever produced in this way. Speigelberg† has, more recently, again examined the question, both clinically, in a patient suffering from convulsions, in whose blood an excess of ammonia and urea was found, and by experiments on dogs, and maintains the accuracy of Frerichs' views. Others have believed that the poisonous elements retained in the blood are not urea or the products of its decomposition, but other extractive matters which have escaped detection. Some cases, however, cannot be explained in this way. As time elapsed, evidence accumulated to show that the relation between albuminuria and eclampsia was not so universal as was supposed, or at least that some other factors were necessary to explain many of the cases. Numerous cases were observed in which albumen was detected in large quantities, without any convulsion following, and that, not only in women who had been the subject of Bright's disease before conception, but also when the albuminuria was known to have developed during pregnancy. Thus Imbert Goubeyre found that out of 164 cases of the latter kind, 95 had no eclmpsia ; and Blot, out of 41 cases, found that 34 were delivered without untoward symptoms. It may be taken as proved, therefore, that albuminria is by no means necessarily accompanied by eclampsia.

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* *The Puerperal Diseases*, p. 125.

† Guy's Hosp. Reps., 1879.

Cases in which the Convulsions preceded the Albuminuria.—Cases were also observed in which the albumen only appeared after the convulsion; and in these it was evident that the retention of urinary elements could not have been the cause of the attack; and it is highly probable that in them the albuminuria was produced by the same cause which induced the convulsion. Special attention has been called to this class of cases by Braxton Hicks,‡ who has recorded a considerable number of them. He says that the nearly simultaneous appearance of albuminuria and convulsion—and it is admitted that the two are almost invariably combined—must then be explained in one of three ways.

1st. That the convulsions are the cause of the nephritis.

2dly. That the convulsions and the nephritis are produced by the same cause, *e. g.*, some detrimental ingredient circulating in the blood, irritating both the cerebro-spinal system and other organs at the same time.

3dly. That the highly congested state of the venous system, induced by the spasm of the glottis in eclampsia, is able to produce the kidney complication.

Theory of Traube and Rosenstein.—More recently Traube and Rosenstein have advanced a theory of eclampsia, purporting to explain these anomalies. They refer the occurrence of eclampsia to acute cerebral anæmia resulting from changes in the blood incident to pregnancy. The primary factor is the hydræmic condition of the blood, which is an ordinary concomitant of the pregnant state, and of course when there is also albuminuria, the water condition of the blood is greatly intensified; hence the frequent association of the two states. Accompanying this condition of the blood, there is increased tension of the arterial system, which is favored by the hypertrophy of the heart which is known to be a normal occurrence in pregnancy. The result of these combined states is a temporary hyperæmia of the brain, which is rapidly succeeded by serous effusion into the cerebral tissues, resulting in pressure on its minute vessels, and consequent anæmia. There is much in this theory that accords with the most recent views as to the etiology of convulsive disease, as, for example, the researches of Kussmaul and Tenner, who have experimentally proved the dependence of convulsion on cerebral anæmia, and of Brown-Séquard, who showed that an anæmic condition of the nerve-centres preceded an epileptic attack. It explains also very satisfactorily how the occurrence of labor should intensify the convulsions, since, during the acme of the pains, the tension of the cerebral arterial system is necessarily greatly increased. There are, however, obvious difficulties against its general acceptance. For example, it does not satisfactorily account for those cases which are preceded by well-marked precursory symptoms, and in which an abundance of albumen is present in the urine. Here the premonitory signs are precisely those which precede the development of uræmia in chronic Bright's disease, the dependence of which on the retention in the blood of urinary elements can hardly be doubted.

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* Amer. Jour., 1861.

† Arch. f. Gyn., 1870.

‡ Obstet. Trans., vol. viii.

Excitability of Nervous System in Puerperal Women as Predisposing to Convulsions.—The key to the liability of the puerperal woman to convulsive attacks is, no doubt, to be found in the peculiar excitable condition of the nervous system in pregnancy—a fact which was clearly pointed out by the late Dr. Tyler Smith, and by many other writers. Her nervous system is, in this respect, not unlike that of children, in whom the predominant influence and great excitability of the nervous system are well-established facts, and in whom precisely similar convulsive seizures are of common occurrence on the application of a sufficiently exciting cause.

Exciting Causes.—Admitting this, we require some cause to set the predisposed nervous system into morbid action; and this we may have either in a toxæmic, or in an extremely watery, condition of the blood, associated with albuminuria; or along with these, or sometimes independently of them, in some excitement, such as strong emotional disturbance. It is highly probable, however, that the theory of Traube affords a true insight into the actual condition of the nerve-centres—a fact of much practical importance in reference to treatment.

Treatment.—We shall here only consider the treatment of cases in which convulsions have actually occurred.

Venesection.—Until quite recently venesection was regarded as the sheet anchor in the treatment, and blood was always removed coupiously, and, there is sufficient reason to believe, with occasional remarkable benefit. Many cases are recorded in which a patient, in apparently profound coma, rapidly regained her consciousness when blood was extracted in sufficient quantities. The improvement, however, was often transient, the convulsions subsequently recurring with increased vigor. There are good theoretical grounds for believing that blood-letting can only be of merely temporary use, and may even increase the tendency to convulsion. These are so well put by Schroeder, that I cannot do better than quote his observations on this point.

Theoretical Objections to Venesection.—"If," he says, "the theory of Traube and Rosenstein be correct, a sudden depletion of the vascular system, by which the pressure is diminished, must stop the attacks. From experience it is known that after venesection the quantity of blood soon becomes the same through the serum taken from all the tissues, while the quality is greatly deteriorated by the abstraction of blood. A short time after venesection we shall expect to find the former blood-pressure in the arterial system, but the blood far more watery than previously. From this theoretical consideration it follows that abstraction of blood, if the above-mentioned conditions really cause convulsions, must be attended by an immediate favorable result, and, under certain circumstances, the whole disease may surely be cut short by it. But, if all other conditions remain the same, the blood-pressure will after some time again reach its former height. The quantity of blood has, in the mean time, been greatly deteriated, and consequently the danger of the disease will be increased."

In Properly-selected Cases Venesection is a Valuable Remedy.—These views sufficiently well explain the varying opinions held with regard to this remedy, and enable us to understand why, while the effects of venesection have been so lauded by certain authors, the mortality has admittedly been much lessened since its indiscriminate use has been abandoned. It does not follow because a remedy, when carried to excess, is apt to be hurtful, that it should be discarded altogether; and I have no doubt that, in properly-selected cases, and judiciously employed, venesection is a valuable aid in the treatment of eclampsia, and that it is specially likely to be useful in mitigating the first violence of the attack, and in giving time for other remedies to come into action. Care should, however, be taken to select the cases properly, and it will be especially indicated when there is marked evidence of great cerebral congestion and vascular tension, such as a livid face, a full bounding pulse, and strong pulsation in the carotids. The general constitution of the patient may also serve as a guide in determining its use, and we shall be the more disposed to resort to it if the patient be a strong and healthy woman; while, on the other hand, if she be feeble and weak, we may wisely discard it, and trust entirely to other means. In any case, it must be looked upon as a temporary expedient only; useful in warding off immediate danger to the cerebral tissues, but never as the main agent in treatment. Nor can it be permissible to bleed in the heroic manner frequently recommended. A single bleeding, the amount regulated by the effect produced, is all that is ever likely to be of service.

Compression of the Carotids.—As a temporary expedient, having the same object in view, compression of the carotids during the paroxysms is worthy of trial. This was proposed by Trousseau in the eclampsia of infants, but I am not aware that it has been tried in puerperal convulsions. It is a simple measure, and it offers the advantage of not leading to any permanent deterioration of the blood, as in venesection.

Administration of Purgatives.—As a subsidiary means of diminishing vascular tension the administration of a strong purgative is desirable, and has the further effect of removing any irritant matter that may be lodged in the intestinal tract. If the patient be conscious a full dose of the compound jalap powder may be given, or a few grains of calomel combined with jalap; and if she be comatose, and unable to swallow, a drop of croton oil, or a quarter of a grain of elaterium, may be placed on the back of the tongue.

Administration of Sedatives and Narcotics.—The great indication in the management of eclampsia is the controlling of convulsive action by means of sedatives. Foremost amongst them must be placed the inhalation of chloroform, a remedy which is frequently remarkably useful, and which has the advantage of being applicable at all stages of the disease, and whether the patient be comatose or not. Theoretical objections have been raised against its employment, as likely to increase cerebral congestion; of this there is no satisfactory proof; on the contrary, there is reason to think that chloroform inhalation has rather the effect of lessening arterial tension, while it certainly controls the violent muscular action by which the hyperæmia is so much increased. Practically no one who has used it can doubt its great value in diminishing the force and frequency of the convulsive paroxysms. Statistically its usefulness is shown by Charpentier, in his thesis on the effects of various methods of treatment in eclampsia, since out of sixty-three cases in which it was used, in forty-eight it had the effect of diminishing or arresting the attacks, one only proving fatal. The mode of administration has varied,

Mode of Administering Chloroform.—Some have given it almost continuously, keeping the patient in a more or less profound state of anæsthesia. Others have contented themselves with carefully watching the patient, and exhibiting the chloroform as soon as there were any indications of a recurring paroxysm, with the view of controlling its intensity. The latter is the plan I have myself adopted, and the value of which, in most cases, I have no doubt. Every now and again, cases will occur in which chloroform inhalation is sufficient to control the paroxysm, or in which, from the very cyanosed state of the patient, its administration seems contra-indicated. Moreover, it is advisable to have, if possible, some remedy more continuous in its action, and requiring less constant personal supervision.

Chloral and Bromide of Potassium.—Latterly the internal administration of chloral has been recommended for this purpose. My own experience is decidedly in its favor, and I have used, as I believe, with marked advantage, a combination of chloral with bromide of potassium, in the proportion of twenty grains of the former to half a drachm of the latter, repeated at intervals of from four to six hours. If the patient be unable to swallow, the chloral may be given in an enema. The remarkable influence of bromide of potassium in controlling the eclampsia of infants would seem to be an indication for its use in puerperal cases. Fordyce Barker is opposed to the use of chloral, which he thinks excites instead of lessening reflex irritability.*

Subcutaneous Injection of Morphia.—Another remedy, not entirely free from theoretical objections, but strongly recommended, is the subcutaneous injection of morphia, which has the advantage of being applicable when the patient is quite unable to swallow. It may be given in doses of one-third of a grain, repeated in a few hours, so as to keep the patient well under its influence. It is to be remembered that the object is to control muscular action, so as to prevent, as much as possible, the violent convulsive paroxysm, and, therefore, it is necessary that the narcosis, however produced, should be continuous.

Rationale of These Remedies.—It is rational, therefore, to combine the intermittent character of chloroform with the more continuous action of other remedies, so that the former should supplement the latter when insufficient.

Other Remedies.—Other remedies, supposed to act in the way of antidotes to uræmic poisoning, have been advised, such as acetic or benzoic acid, but they are far too uncertain to have any reliance placed on them, and they distract attention from more useful measures.

Precautions during the Paroxysm.—Precautions are necessary during the fits to prevent the patient from injuring herself, especially to obviate laceration of the tongue; the latter can be best done by placing something between the teeth as the paroxysm comes on, such as the handle of a teaspoon enveloped in several folds of flannel.

Obstetric Management.—The obstetric management of eclampsia will naturally give rise to much anxiety; and on this point there has been considerable difference of opinion. On the one hand, we have practitioners who advise the immediate emptying of the uterus, even when labor has commenced; on the other, those who would leave the labor entirely alone. Thus Gooch said, "attend to the convulsions, and leave the labor to take care of itself;" and Schroeder says, "especially no kind of obstetric manipulation is required for the safety of the mother," but he admits, however, that it is sometimes advisable to hasten the labor to insure the safety of the child.

In cases in which the convulsions come on during labor, the pains are often strong and regular, the labor progresses satisfactorily, and no interference is needful. In others we cannot but feel that emptying the uterus would be decidedly beneficial. We have to reflect, however, that any active interference might, of itself, prove very irritating, and excite fresh attacks. The influence of uterine irritation is apparent, by the frequency with which the paroxysms recur with the pains. If, therefore, the os be undilated, and labor have not begun, no active means to induce it should be adopted, although the membranes may be ruptured with advantage, since that procedure tends to no irritation. Forcible dilatation of the os, and especially turning, are strongly contra-indicated.

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* The Puerperal Diseases, p. 120.

The rule laid down by Tyler Smith seems that which is most advisable to follow—that we should adopt the course which seems least likely to prove a source of irritation to the mother. Thus if the fits seem evidently induced and kept up by the pressure of the fœtus, and the head be within reach, the forceps, or even craniotomy may be resorted to. But if, on the other hand, there be reason to think that the operation necessary to complete delivery is likely *per se* to prove a greater source of irritation than leaving the case to nature, then we should not interfere.—W. S. PLAYFAIR.

PUERPERAL EPHEMERA.—*Natural History.*—A fever, consisting of one or more paroxysms, occurring a few days after delivery, generally attended by diminution of the milk and lochia, and unaccompanied by local lesions.

This disease approaches in type to malarious fever of the intermittent form, of short duration, and often regarded as a feverish cold or chill. It is rare before the seventh day after delivery, and is most apt to occur in a humid malarious atmosphere, especially in low, marshy, thinly-populated districts, or where stagnant ditches intersect houses, or where dwellings have been erected over rubbish thrown into shallow pools.

Increase of temperature, with rigors and perspiration, are the earliest indications of the disease—which derives importance from its alarming resemblance to the onset of pyæmia or puerperal fever. The rigors are usually of great severity and long continuance, attended with more or less pains in the head, the back and extremities. Depression is great. The features shrink ; they appear pinched, and the eyeballs sink back in their sockets. The fingers may have a livid, shrivelled aspect, as in the chill of an ague. The pulse is feeble and but slightly accelerated. The secretions are arrested. Depression of spirits, with hysterical phenomena, are apt to prevail, and delirium may supervene.

Profuse perspiration usually betokens a crisis, when the patient begins to get well. The secretions are restored and flow freely, and the patient gets quiet and restoring sleep.

Treatment consists in restoring warmth till the stage of chilliness has passed away ; restoration of arrested secretion by suitable remedies, and subsequently tonics and nutritious diet during convalescence.—WILLIAM AITKEN.

PUERPERAL FEVER.—*Definition.*—Very rare. A continued fever, contagious (or infectious ?) affecting puerperal women at any time within two weeks after delivery, or even commencing before delivery.

Causes.—Direct contagion, or from infected air ; from the aggregation of puerperal cases. Other specific fevers affecting puerperal women are not to be designated puerperal fever, even though they may be epidemic in puerperal cases.

Symptoms.—Severe rigor, general constitutional disturbance, loss of appetite and sleep, diarrhœa, arrest of lochia and secretion of milk, and the excretion of urine.

Signs.—High temperature, pulse frequent, full, or weak and incompressible, distressed countenance, tongue furred, purplish flushes, delirium.

Diagnosis.—From puerperal septicæmia by absence of septic cause, by absence of fetid lochia, by absence of early tympanites or abdominal tenderness.

Prognosis.—Unfavorable.

Treatment.—In sthenic cases, venesection, chloral, salines; in asthenic cases, large doses of quinine; alcohol, opium, veratrum viride.—HEYWOOD SMITH.

PUERPERAL INSANITY.—*Classification.*—Under the head of "Puerperal Mania," writers on obstetrics have indiscriminately classed all cases of mental disease connected with pregnancy and parturition. The result has been unfortunate, for the distinction between the various types of mental disorder has, in consequence, been very generally lost sight of. But little study of the subject suffices to show that the term Puerperal Mania is wrong in more ways than one, for we find that a large number of cases are not cases of "mania" at all, but of melancholia; while a considerable number are not, strictly speaking, "puerperal," as they either come on during pregnancy, or long after the immediate risks of the puerperal period are over, being in the latter case associated with anæmia produced by over-lactation.

Puerperal insanity may be divided into three classes of cases. For the sake of brevity, the generic term "Puerperal Insanity" may be employed to cover all cases of mental disorders connected with gestation, which may be further conveniently subdivided into three classes, each having its special characteristics, viz.:

I. The Insanity of Pregnancy.

II. Puerperal Insanity, properly so-called, that is insanity coming on within a limited period after delivery.

III. The Insanity of Lactation.

This division is a strictly natural one, and includes all the cases likely to come under observation. The relative proportion these classes bear to each other can only be determined by accurate statistical observations on a large scale, but these materials we do no possess. The returns from large asylums are obviously open to objection, for only the worst and most confirmed cases find their way into these institutions, while by far the greater proportion, both before and after labor, are treated in their own homes.

Taking such returns as only approximative, we find from Dr. Batty Tuke * that in the Edinburgh Asylum out of 105 cases of puerperal insanity, 28 occurred before delivery, 13 during the puerperal period, and 54 during lactation. The relative proportions of each per hundred are as follows:

Proportion of these Forms of Insanity:	Insanity of Pregnancy,	8.06 per cent.
	Puerperal Insanity,	47.09 "
	Insanity of Lactation,	34. 8

Marce † collects together several series of cases from various authorities, amounting to 310 in all, and the results are not very different from those of the Edinburgh Asylum, except in the relatively smaller number of cases occurring before delivery. The percentage calculated from his figures is:—

Insanity of Pregnancy,	8.06 per cent.
Puerperal Insanity,	58.06 "
Insanity of Lactation,	30.30 "

As each of these classes differs in various important respects from the others, it will be better to consider each separately.

Insanity of Pregnancy.—The Insanity of Pregnancy is, without doubt, the least common of the three forms. The intense mental depression which in many women accompanies pregnancy, and causes the patient to take a desponding view of her condition, and to look forward to the result of her labor with the most gloomy apprehension, seems to be often only a lesser degree of the actual mental derangement which is occasionally met with. The relation between the two states is further borne out by the fact that a large majority of cases of insanity during pregnancy are well-marked types of melancholia; out of 28 cases, reported by Tuke, 15 were examples of pure melancholia, 5 of dementia with melancholia. In many of these the attack could be traced as developing itself out of the ordinary hypochondriasis of pregnancy. In others the symptoms came on at a later period of pregnancy, the earlier months of which had not been marked by any unusual lowness of spirits.

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* *Edin. Med. Journ.*, vol. x.

† Traite de la Folie des Femmes enceintes.

Predisposing Causes.—The age of the patient seems to have some influence, the proportion of cases between 30 and 40 years of age being much larger than in younger women. A larger proportion of cases occur in primiparæ than in multiparæ, a fact that, no doubt, depends on the greater dread and apprehension experienced by women who are pregnant for the first time, especially if not very young. Hereditary disposition plays an important part, as in all forms of puerperal insanity. It is not always easy to ascertain the fact of an hereditary taint since it is often studiously concealed by the friends. Tuke, however, found distinct evidence of it in no less than 12 out of 28 cases. Furstner[*] believes that other neuroses have an important influence in the causation of the disease. Out of 32 cases he found direct hereditary taint in 9, but in 11 more there was a amily history of epilepsy, drunkenness, or hysteria.

Period of Pregnancy at which it Occurs.—The period of pregnancy, at which mental derangement most commonly shows itself, varies. Most generally, perhaps, it is at the end of the third, or the beginning of the fourth month. It may, however, begin with conception, and even return at every impregnation. Montgomery relates an instance in which it recurred in three successive pregnancies. Marce distinguishes between true insanity coming on during pregnancy, and aggravated hypochondriasis, by the fact that the latter usually lessens after the third month, while the former most commonly only begins after that date. It is unquestionable that in many cases no such distinction can be made, and that the two are often very intimately associated.

Forms of Insanity.—The form of insanity does not differ from ordinary melancholia. The suicidal tendency is generally very strongly developed. Should the mental disorder continue after delivery, the patient may very probably experience a strong impulse to kill her child. Moral perversions have been not uncommonly observed. Tuke especially mentions a tendency to dipsomania in the early months, even in women who have not shown any disposition to excess at other times. He suggests that this may be an exaggeration of the depraved appetite, or morbid craving, so commonly observed in pregnant women, just as melancholia may be a further development of lowness of spirits. Laycock mentions a disposition to "kleptomania" as very characteristic of the disease. Casper[†] relates a curious case where this occurred in a pregnant lady of rank, and the influence of pregnancy, in developing an irresistible tendency, was pleaded in a criminal court trial in which one of her petty thefts had involved her.

Prognosis.—The prognosis may be said to be, on the whole, favorable. Out of Dr. Tuke's 28 cases 19 recovered within six months. There is little hope of a cure until after a termination of the pregnancy, as out of 19 cases recorded by Marce, only in 2 did the insanity disappear before delivery.

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[*] Archiv fur Psychiatrie, Band v. Heft 2.

[†] Casper's Forensic Medicines, Vol. iv.

Transient Mania During Delivery.—There is a peculiar form of mental derangement sometimes observed during labor, which is by some talked of as a temporary insanity. It may, perhaps, be more accurately described as a kind of acute delirium, produced, in the latter stage of labor, by the intensity of the suffering caused by the pains. According to Montgomery, it is most apt to occur as the head is passing through the os uteri, or, at a later period, during the expulsion of the child. It may consist of merely a loss of control over the mind, during which the patient, unless carefully watched, might, in her agony, seriously injure herself or her child. Sometimes it produces actual hallucination, as in the case described by Tarnier, in which the patient fancied she saw a spectre standing at the foot of her bed, which she made violent efforts to drive away. This kind of mania, if it may be so called, is merely transitory in its character, and disappears as soon as the labor is over. From a medico-legal point of view it may be of importance, as it has been held by some that in certain cases of infanticide the mother has destroyed the child when in this state of transient frenzy, and when she was irresponsible for her acts. In the treatment of this variety of delirium we must, of course, try to lessen the intensity of the suffering, and it is in such cases that chloroform will find one of its most valuable applications.

Puerperal Insanity (*proper*).—True puerperal insanity has always attracted much attention from obstetricians often to the exclusion of other forms of mental disturbance connected with the puerperal state. We may define it to be that form of insanity which comes on within a limited period after delivery, and which is probably intimately connected with that process. Out of 73 examples of the disease tabulated by Dr. Tuke, only 2 came on later than a month after delivery, and in these there were other causes present, which might possibly remove them from this class.

Form of Insanity.—Although a large number of these cases assume the character of acute mania, that is by no means the only kind of insanity which is observed, a not inconsiderable number being well-marked examples of melancholia. The distinction between them was long ago pointed out by Gooch, whose admirable monograph on the disease contains one of the most graphic and accurate accounts of puerperal insanity that has yet been written.

Acute Mania Generally After Delivery, Melancholia at a Later Period.—There are also some peculiarities as to the period at which these varieties of insanity show themselves, which, taken in connection with certain facts in their etiology, may eventually justify us in drawing a stronger line of demarcation between them than has been usual. It appears that cases of acute mania are apt to come on at a period much nearer delivery than melancholia. Thus Tuke found that all the cases of mania came on within sixteen days after delivery, and that all cases of melancholia developed themselves after that period. We shall presently see that one of the most recent theories as to the causation of the disease attributes it to some morbid condition of the blood. Should further investigation confirm this supposition, inasmuch as septic conditions of the blood are most likely to occur a short time after labor, it would not be an improbable hypothesis that cases of acute mania, occurring within a short time after labor, may depend on such septic causes, while melancholia is more likely to arise from general conditions favoring the development of mental disease. This must, however, be regarded as a mere speculation requiring further investigation.

Causes.—Hereditary predisposition is very frequently met with, and a careful inquiry into the patient's history will generally show that other members of the family have suffered from mental derangement. Reid found that out of 111 cases in Bethlehem Hospital there was clear evidence of hereditary taint in 45. Tuke made the observation in 22 out of his 73 cases; and, indeed, it is pretty generally admitted by all alienist physicians that hereditary tendencies form one of the strongest predisposing causes of mental disturbance in the puerperal state. In a large proportion of cases circumstances producing debility and exhaustion, or mental depression, have preceded the attack. Thus it is often found that patients attacked with it have had post-partum hæmorrhage, or have suffered from some other conditions producing exhaustion, such as severe and complicated labor; or they may have been weakened by over-frequent pregnancies, or by lactation during the early months of pregnancy. Indeed anæmia is always well marked in this disease. Mental conditions are frequently traceable in connection with its production. Morbid dread during pregnancy, insufficient to produce insanity before delivery, may develop into mental derangement after it. Shame and fear of exposure in unmarried women not unfrequently lead to it, as is evidenced by the fact that out of 2281 cases gathered from the reports of various asylums, above 64 per cent. were unmarried.* Sudden moral shocks or vivid mental impressions may be the determining cause in predisposed persons Gooch narrates an example of this in a lady who was attacked immediately after a fright produced by a fire close to her house, the hallucinations in this case being all connected with light; and Tyler Smith that of another whose illness dated from the sudden death of a relative. The age of the patient has some influence, and there seems to be a decidedly greater liability at advanced ages; especially when such women are pregnant for the first time.

Theory of Its Dependence on Morbid State of the Blood.—The possibility of the acute form of puerperal insanity, coming on shortly after delivery, being dependent on some form of septicæmia is one which deserves careful consideration. The idea originated with Sir James Simpson, who found albumen in the urine of four patients. He suggested that this might probably indicate the presence in the blood of a certain urinary constituents, which might have determined the attack, much in the same way as in eclampsia. Dr. Donkin subsequently wrote an important paper,† in which he warmly supported this theory, and arrived at the conclusion, "that the acute dangerous class of cases are examples of uræmic blood-poisoning, of which the mania, rapid pulse, and other constitutional symptoms are merely the phenomena; and that the affection therefore, ought to be termed uræmic or renal puerperal mania, in contradistinction to the other form of the disease." He also suggests that the immediate poison may be carbonate of ammonia, resulting from the decomposition of urea retained in the blood. It will be observed, therefore, that the pathological condition producing puerperal mania would, supposing this theory to be correct, be precisely the same as that which, at other times, is supposed to give rise to puerperal eclampsia. There can be no doubt that the patient, immediately after delivery, is in a condition rendering her peculiarly liable to various forms of septic disease: and it must be admitted that there is no inherent improbability in the supposition that some morbid material circulating in the blood may be the effective cause of the attack, in a person otherwise predisposed to it. It is also certain, as I have already pointed out, that there are two distinct classes, differing according to the period after delivery at which the attack comes on. Whether this difference depends on the presence in the blood of some septic matter (especially urinary excreta) is a question which our knowledge by no means justifies us in answering; it is however, one which well merits further careful study.

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* Journal of Mental Science, 1870—1, p. 159.

† Edin. Med. Journal, vol. vii.

Objections to this Theory.—It is only fair to point to some difficulties which appear to militate against the views which Dr. Donkin maintains. In the first place, the albuminuria is merely transient, while its supposed effects last for weeks or months. Sir James Simpson says, with regard to his cases: "I have seen all traces of albuminuria in puerperal insanity disappear from the urine within fifty hours of the access of the malady. The general rapidity of its disappearance is, perhaps, the principal, or indeed, the only reason why this complication has escaped the notice of those physicians among us who devote themselves with such ardor and zeal to the treatment of insanity in our public asylums." This apparent anomaly Simpson attempts to explain by the hypothesis that, when once the uræmic poisoning has done its work, and set the disease in progress, the mania progresses of itself. This, however, is pure speculation; and, in the supposed analogous case of eclampsia, the albuminuria certainly lasts as long as its effects. It is not easy to understand, also, why uræmic poisoning should in one case give rise to insanity, and in another to convulsions. For all we know to the contrary, transient albuminuria may be much more common after delivery than has been generally supposed, and further investigation on this point is required. Albumen is by no means unfrequently observed in the urine, for a short time, in various conditions of the body, without any serious consequences, as, for example, after bathing; and we may too readily draw an unjustifiable conclusion from its detection in a few cases of mania. There are, however, many other kinds of blood-poisoning, besides uræmia, which may have an influence in the production of the disease, and it is to be hoped that future observations may enable us to speak with more certainty on this point.

Prognosis.—The prognosis of puerperal insanity is a point which will always deeply interest those who have to deal with so distressing a malady. It may resolve itself into a consideration of the immediate risk to life, and of the chances of ultimate restoration of the mental faculties. It is an old aphorism of Gooch's, and one the correctness of which is justified by modern experience, that "mania is more dangerous to life, melancholia to reason." It has very generally been supposed that the immediate risk to life in puerperal mania is not great, and, on the whole, this may be taken as correct. Tuke found that death took place, from all causes, in 10.9 of the cases under observation; these, however, were all women who had been admitted into asylums, and in whom the attack may be assumed to have been exceptionally severe. Great stress was laid by Hunter and Gooch on extreme rapidity of the pulse, as indicating a fatal tendency. There can be no doubt that it is a symptom of great gravity, but by no means one which need lead us to despair of our patient's recovery. The most dangerous class of cases are those attended with some inflammatory complication; and if there be marked elevation of temperature, indicating the presence of some such concomitant state, our prognosis must be more grave than where there is mere excitement of the circulation.

Post-mortem Signs.—There are no marked post-mortem signs found in fatal cases to guide us in forming an opinion as to the nature of the disease. "No constant morbid changes," says Tyler Smith, "are found within the head, and most frequently the only condition found in the brain is that of unusual paleness and exsanguinity. Many pathologists have also remarked upon the extremely empty condition of the blood-vessels, particularly the veins.

Duration of the Disease.—The duration of the disease varies considerably. Generally speaking, cases of mania do not last so long as melancholia, and a recovery takes place within a period of three months, often earlier. Very few of the cases admitted into the Edinburgh Asylum remained there more than six months, and after that time the chances of ultimate recovery greatly lessened. When the patient gets well, it often happens that her recollection of the events occurring during her illness is lost ; at other times, the delusions from which she suffered remain, as, for example, in a case which was under my care, in which the personal antipathies which the patient formed when insane became permanently established.

Insanity of Lactation.—54 out of 155 cases collected by Dr. Tuke were examples of the insanity of lactation, which would appear, therefore, to be nearly twice as common as that of pregnancy, but considerably less so than the true puerperal form. Its dependence on causes producing anæmia and exhaustion is obvious and well marked. It generally occurs in women with debilitated constitutions. In the large majority of cases it occurs in multiparæ who have been debilitated by frequent pregnancies, and by length of nursing. When occurring in primiparæ, it is generally in women who have suffered from post-partum hæmorrhage, or other causes of exhaustion, or whose constitution was such as should have contra-indicated any attempt at lactation. The bruit-de-diable is almost invariably present in the veins of the neck, indicating the impoverished condition of the blood.

It is Generally Melancholic in Type.—The type is far more frequently melancholic than maniacal, and when the latter form occurs, the attack is much more transient than in true puerperal insanity. The danger to life is not great, especially if the cause producing debility be recognized and at once removed. There seems, however, to be more risk of the insanity becoming permanent than in the other forms. In twelve out of Dr. Tuke's cases the melancholia degenerated into dementia, and the patient became hopelessly insane.

Symptoms.—The symptoms of these various forms of insanity are practically the same as in the non-pregnant state.

On Cases of Mania.—Generally in cases of mania there is more or less premonitory indication of mental disturbance, which may pass unperceived. The attack is often preceded by restlessness and loss of sleep, the latter being a very common and well-marked symptom ; or, if the patient do sleep, her rest is broken and disturbed by dreams. Causeless dislikes to those around her are often observed ; the nurse, the husband, the doctor, or the child, becomes the object of suspicion, and, unless proper care be taken, the child may be seriously injured. As the disease advances, the patient becomes incoherent and rambling in her talk, and, in a fully developed case, she is incessantly pouring forth an unconnected jumble of sentences, out of which no meaning can be made. Often some prevalent idea which is dwelling in the patient's mind can be traced running through her ravings, and it has been noticed that this is frequently of a sexual character, causing women of unblemished reputation to use obscene and disgusting language, which it is difficult to understand their ever having heard. The tendency of such patients to make accusations impugning their own chastity was specially insisted on by many eminent authorities in a recent celebrated trial, when Sir James Simpson stated that in his experience "the organ diseased gave a type to the insanity, so that with women suffering from the affections of the genital organs the delusions would be more likely to be connected with sexual matters." Religious delusions, as a fear of eternal damnation, or of having committed some unpardonable sin, are of frequent occurrence, but perhaps more often in cases which are tending to the melancholic type. There is generally intolerable restlessness, and the patient's whole manner and appearance are those of excessive excitement. She may refuse to remain in bed, may tear off her clothes, or attempt to injure herself. The suicidal tendency is often very marked. In one case under my care, the patient made incessant efforts to destroy herself, which were only frustrated by the most careful watching; she endeavored to strangle herself with the bed-clothes, to swallow any article she could lay hold of, and even to gouge out her own eyes. Food is generally persistently refused, and the utmost coaxing may fail in inducing the patient to take nourishment. The pulse is rapid and small; and the more violent the excitement and furious the delirium, the more excited is the circulation. The tongue is coated and furred, the bowels constipated and disordered, and the feces, as well as the urine, are frequently passed involuntarily. The urine is scanty and high-colored, and, after the disease has lasted for some time, it becomes loaded with phosphates. The lochia, and the secretion of milk, generally becomes arrested at the beginning of the disease. The waste of tissue, from the incessant restlessness and movement of the patient, is very great ; and, if the disease continue for some time, she falls into a condition of marasmus, which may be so excessive, that she becomes wasted to a shadow of her former size.

Symptoms in Melancholia.—When the insanity assumes the form of melancholia, its advent is more gradual. It may commence with depression of spirits, without any adequate cause, associated with insomnia, disturbed digestion, headache, and other indications of bodily derangement. Such symptoms, showing themselves in women who have been nursing for a length of time, or in whom any other evident cause of exhaustion exists, should never pass unnoticed. Soon the signs of mental depression increase, and positive delusions show themselves. These may vary much in their amount, but they are all more or less of the same type, and very often of a religious character. The amount of constitutional disturbance varies much. In some cases which approach in character those of mania, there is considerable excitement, rapid pulse, furred tongue, and restlessness. Probably cases of acute melancholia, coming on during the puerperal state, most often assume this form. In others again there is less of these general symptoms, the patients are profoundly dejected, sit for hours without speaking or moving ; but there is not much excitement, and this is the form most generally characterizing the insanity of lactation. In all cases there is a marked disinclination for food. There is also, almost invariably, a disposition to suicide ; and it should never be forgotten in melancholic cases that this may develop itself in an instant, and that a moment's carelessness on the part of the attendants may lead to disastrous results.

Treatment.—Bearing in mind what has been said of the essential character of puerperal insanity, it is obvious that the course of treatment must be mainly directed to maintain the strength of the patient, so as to enable her to pass through the disease without fatal exhaustion of the vital powers, while we endeavor, at the same time, to calm the excitement, and give rest to the disturbed brain. Any over-active measures—for example, bleeding, blistering the shaven scalp, and the like—are distinctly contra-indicated.

There is a general agreement on the part of the alienist physicians, that in cases of acute mania, the two things most needful are a sufficient quantity of suitable food and sleep.

Importance of Administering Nourishment.—Every endeavor should be made to induce the patient to take abundance of nourishment, to remedy the effects of the excessive waste of tissue and support her strength until the disease abates. Dr. Blandford, who has especially insisted on the importance of this, says,* "Now, with regard to the food, skillful attendants will coax a patient into taking a large quantity, and we can hardly give too much. Messes of minced meat with potato and greens, diluted with beef-tea, bread and milk, rum and milk, arrowroot, and so on, may be got down. Never give mere liquids so long as you can get down solids. As the malady progresses, the tongue and mouth may become so dry and foul that nothing but liquids can be swallowed; but, reserving our beef-tea and brandy, let us give plenty of solid food while we can."

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* Blandford, Insanity and its Treatment.

Forcible Administration of Food.—The patient may in mania, as well as in melancholia, perhaps even more in the latter, obstinately refuse to take nourishment at all, and we may be compelled to use force. Various contrivances have been employed for this purpose. One of the simplest is introducing a dessert-spoon forcibly between the teeth, the patient being controlled by an adequate number of attendants, and slowly injecting into the mouth suitable nourishment, by an india-rubber bottle with an ivory nozzle, such as is sold by all chemists. Care must be taken not to inject more than an ounce at a time, and to allow the patient to breathe between each deglutition. So extreme a measure will seldom be required, if the patient have experienced attendants, who can overcome her resistance of food by gentler means; but it may be essential, and it is far better to employ it than to allow the patient to become exhausted from want of nourishment. In one case I had to feed a patient in this way three times a day for several weeks; and used for the purpose a contrivance known in asylums as Paley's feeding-bottle, which reduced the difficulty of the process to a minimum. Beef-tea, or strong soup, mixed with some farinaceous material, such as Revalenta Arabica, or wheaten flour, or milk, forms the best mess for this purpose.

Stimulants.—In the early stages the patient is probably better without stimulants, which seem only to increase the excitement. As the disease progresses, and exhaustion becomes marked, it may be necessary to have recourse to them. In melancholia they seem to be more useful, and may be administered with greater freedom.

State of the Bowels.—The state of the bowels requires especial attention. They are almost always disordered, the evacuations being dark and offensive in odor. In the early stages of the disease the prompt clearing of the bowels, by a suitable purgative, sometimes has the effect of cutting short an impending attack. A curious example of this is recorded by Gooch, in which the patient's recovery seemed to date from the free evacuation of the bowels. A few grains of calomel, or a dose of compound jalap powder, or of castor oil, may generally be readily given. During the continuance of the illness the state of the primæ viæ should be attended to, and occasional aperients will be useful, but strong and repeated purgation is hurtful from the debility it produces.

The Procuring of Sleep.—The procuring of sleep will necessarily form one of the most important points of treatment. For this purpose there is no drug so valuable as the hydrate of chloral, either alone or in combination with bromide of potassium, which has a distinct effect in increasing its hypnotic action. Given in a full dose at bedtime, say 15 grs. to ʒ ss, it rarely fails in procuring at least some sleep, and, in an early stage of acute mania, this may be followed by the best effects. It may be necessary to repeat this draught night after night, during the acute stage of the malady. If we cannot induce the patient to swallow the medicine, it may be given in the form of enema.

Question of Administering Opiates.—It is generally admitted that in mania, preparations of opium, formerly much relied on in the treatment of the disease, are apt to do more harm than good. Dr. Blandford gives a strong opinion on this point. He says: "In prolonged delirious mania I believe opium never does good, and may do great harm. We shall see the effects of narcotic poisoning if it be pushed, but none that are beneficial. This applies equally to opium given by the mouth and by subcutaneous injection. The latter, as it is more certain and effectual in producing good results, is also more deadly when it acts as a narcotic poison. After the administration of a dose of morphia by the subcutaneous method, the patient will probably at once fall asleep, and we congratulate ourselves that our long wished for object is attained. But after half an hour or so the sleep suddenly terminates, and the mania and excitement are worse than before. Here you may possibly think that had the dose been larger, instead of half an hour's sleep you would have obtained one of longer duration, and you may administer more, but with a like result. Large doses of morphia not merely fail to produce refreshing sleep; they poison the patient, and produce, if not the symptoms of actual narcotic poisoning, at any rate that typhoid condition which indicates prostration and approaching collapse. I believe there is no drug, the use of which more often becomes abused, than that of opium." It is otherwise in cases of melancholia, especially in the more chronic forms. In these opiates, in moderate doses, not pushed to excess, may be given with great advantage. The subcutaneous injection of morphia is by far the best means of exhibiting the drug, from its rapidity of action, and facility of administration.

Other Calmatives.—There are other methods of calming the excitement of the patient besides the use of medicines. The prolonged use of the warm bath, the patient being immersed in water at a temperature of 90° or 92° for at least half an hour, is highly recommended by some as a sedative. The wet pack serves the same purpose, and is more readily applied in refractory subjects.

Importance of Judicious Nursing.—Judicious nursing is of primary importance. The patient should be kept in a cool, well ventilated, and somewhat darkened room. If possible she should remain in bed, or, at least, endeavors should be made to restrain the excessive restless motion, which has so much effect in promoting exhaustion. The presence of relatives and friends, especially the husband, has generally a prejudicial and exciting effect; and it is advisable to place the patient under the care of nurses experienced in the management of the insane, who, as strangers, are likely to have more control over her. It is not too much to say that much of the success in treatment must depend on the manner in which this indication is met. Rough, unskilled nurses, who do not know how to use gentleness combined with firmness, will certainly aggravate and prolong the disorder. Inasmuch as no patient should be left unwatched by day or night, more than one nurse is essential.

Question of Removal to an Asylum.—The question of the removal of the patient to an asylum is one which will give rise to anxious consideration. As the fact of having been under such restraint of necessity fixes a certain lasting stigma upon a patient, this is a step which every one would wish to avoid if possible. In cases of acute mania, which will probably last a comparatively short time, home treatment can generally be efficiently carried out. Much must depend on the circumstances of the patient. If these be of a nature which preclude the possibility of her obtaining thoroughly efficient nursing and treatment in her own home, it is advisable to remove her to a place where these essentials can be obtained, even at the cost of some subsequent annoyance. In cases of chronic melancholia, the management of which is on the whole more difficult, the necessity for such a measure is more likely to arise, and should not be postponed too late. Many examples of incurable dementia, arising out of puerperal melancholia, can be traced to unnecessary delay in placing the patients under the most favorable conditions for recovery.

Treatment During Convalescence.—When convalescence is commencing, change of air and scene will often be found of great value. Removal to some quiet country place, where the patient can enjoy abundance of air and exercise, in the company of her nurses, without the excitement of seeing many people is especially to be recommended. Great caution must be used in admitting the visits of relatives and friends. In two cases under my own care the patients relapsed, when apparently progressing favorably, because the husbands insisted, contrary to advice, on seeing them. On the other hand, Gooch has pointed out that, when the patient is recovering, when month after month has been passed in seclusion without any improvement, the visit of a friend or relative may produce a favorable moral impression, and inaugurate a change for the better. It is probably in cases of melancholia, rather than in mania, that this is likely to happen. The experiment may, under such circumstances, be worth trying; but it is one the result of which we must contemplate with some anxiety.—W. S. PLAYFAIR.

PUERPERAL MALARIAL FEVER.—The title of this paper is one not yet adopted in medical literature in the nomenclature of disease, but it is so significant a term, as descriptive of the etiology, pathology, and clinical phenomena of a class of affections in late years frequently met with in puerperal women in this city and vicinity, that I have for several years made use of it. I find also that it is now coming into general use by the profession in this city. The disease itself has probably been met with by most who are engaged in obstetric practice in malarial regions. But the period of its development, and its similarity, in many of its prominent symptoms, to other and more grave affections, renders it worthy of careful study. I have thought that might do the profession a service by calling their attention to this subject, and attempting to clearly define the character of the disease, its pathology, its differential diagnosis from other affections, and its appropriate treatment.

The occurrence of chills, a high temperature, rapid pulse, and great depression of the vital forces, in a puerperal woman, must inevitably cause anxiety in the mind of her medical attendant; and this anxiety must be greatly increased if there be also some indications of a local pelvic phlegmasia, or the foregoing phenomena are followed by such grave complications as mania, secondary hæmorrhage, and the development, some days after parturition, of extremely offensive lochia. Hence the great importance of being able to decide whether the symptoms be due to one of the puerperal diseases strictly so-called, such as epidemic puerperal fever, septicæmia, plebitis, or metritis, or whether it be due to constitutional infection from telluric or atmospheric causes, acting upon a system, whose physiological condition is modified by the various changes which are taking place during puerperal convalescence. The success of treatment and the prognosis must greatly depend on the correctness ot the diagnosis. It will be observed that I have not included peritonitis among the local plegmasiæ, because hitherto it has never happened to me to see puerperal malarial fever attended with symptoms which simulate either septic or traumatic peritonitis.

I propose now to study the chief phenomena of those cases which have come under my observation, now amounting to a considerable number, in order to determine whether it be possible, generally, to decide as to the diagnosis, and select appropriate treatment which shall, in a large majority of such cases, secure recovery. I must, however, remark that only three of these cases have occurred in my own practice, all the rest having been seen by me in consultation with other medical men By the kindness of these gentlemen, I have full and detailed reports of seventeen cases, which have occurred in this city and its suburbs, but even an abstract of these reports would occupy more space than would be profitable in a paper in a medical journal. I must, therefore, present only a summary of the aggregate results, with the conclusions at which I have arrived, feeling assured in my own mind that they will hereafter be confirmed by the clinical studies of others.

Period of Invasion.—Puerperal malarial fever may be developed at any period following parturition, until the physiological changes which constitute puerperal convalescence are completed. The earliest period occurred in a patient of Dr. Howard Pinkney, in less than twenty-four hours after parturition, which was entirely normal in its character.

"She was suddenly attacked with a severe, prolonged chill and acute pain in the left groin and the left thigh. This pain was relieved by opiates, but was followed by fever and perspiration." Dr. Pinkney regarded the affection as malarial, and gave quinine in full doses, "but this caused headache and ringing in the ears, and was stopped. But the intermittent febrile attack continuing, a distinguished obstetrician was called, who pronounced the case one of well-marked septicæmia, the temperature being at this time one hundred and five degrees, and recommended cold water affusions on a special bed for the purpose." But before this could be procured, the temperature had fallen so much that it was not considered necessary to make use of it. The consulting physician was then called again, when finding the temperature still lower, and the patient perspiring freely, he frankly expressed the opinion that he was mistaken in his diagnosis, and now regarded it as a malarial fever, and therefore no longer advised the use of the water-bed. The quinine was now resumed, in doses that could be tolerated, but the remissions and exacerbations of fever continuing, I was asked to see the patient on the twelfth day after parturition. I recommended the quinine in large doses combined with the bromide of potassium, to counteract the tendency of the quinine to produce cerebral congestion. The cenvalescence of the patient after this was rapid. It may be remarked that throughout the whole period of her illness the function of lactation was perfect and the lochia normal in character and quantity.

The latest period of invasion was in one of my own patients.

Her labor was normal in every respect, and her convalescence so perfect that I had ceased attendance, except a weekly visit which I usually make until the end of the month. On the morning of the 21st day, she wes awakened by a severe chill, with violent pains in her head and bones. When I saw her, soon after 9 A. M., she had a temperature of 105.6°, a pulse of 128, and she was decidedly delirious. There was no abdominal tenderness, involution was complete, the lochia had ceased for some days, and a vaginal examination was entirely negative in its results. Twenty grains of quinine were at once ordered, with one grain of codeia to allay nerve irritation. The same dose was repeated in the evening. The following day, after passing an excellent night of sleep, she seemed perfectly well, had a good appetite, temperature and pulse nearly normal, but she complained of feeling very weak. The quinine and codeia were continued in half doses, that is, ten grains of the former and half a grain of the latter morning and evening. The next morning she was again seized with a violent chill, and when I saw her the pulse was 144, the temperature was 106°, and she was more delirious than on the first day of the attack. The full dose of the quinine and codeia was then given with five grains of calomel. One hour after I left her, she had a profuse and alarming hæmorrhage from the uterus. When I saw her again, the pulse was very rapid and feeble, the breathing hurried and gasping, and her surface cold and clammy. Brandy and ammonia were given and a large vaginal injection of water as hot as could be borne was at once administered. The three days following, she took each day sixty grains of quinine and three of codeia, and also three times a day a mixture in which were 25 drops of the tinct. of chloride of iron, 20 drops of Squibb's fluid extract of ergot, and 15 drops of the tinct. of nux vomica. On the 30th day after confinement, she was so thoroughly convalescent as to require no more medicine.

To conclude this part of my subject then, I will say that in one case only has this form of fever been developed so early as the first day, and in none later than the twenty-first of the puerperal period.

Symptoms.—The most prominent of these are chills, sometimes very slight, often a temperature one or two degrees higher than is found in the beginning of any other puerperal disease, a rapid pulse, followed by greater prostration than is usual with other diseases during this period. Then in these cases, where the disease first manifests itself by such an explosion of striking and alarming symptoms, there is a remarkable remission on the following day, so that the obstetrical attendant flatters himself that the attack is ephemeral and that his treatment has been most wise and successful, but his delusion is removed one, two, or three days after by a recurrence of the attack, but generally less severe. But the succession of phenomena just described only appears in typical cases. I am disposed to believe that, in a large majority of cases, three or four days before the explosion, the patient finds herself depressed by a general sense of malaise, more or less pain in the head, back, and bones; insomnia, thirst and loss of appetite, and when the disease is developed, the chills are less severe, the temperature not so high, the pulse less rapid, and the remission less marked, and my observation would lead me to the conclusion that the malady is more persistent and responds less readily to treatment. In this form where the disease manifests itself in the early days after confinement, and is ushered in by a chill of moderate intensity, and the patient is dull, heavy and sleepy, with moderate wandering delirium, and especially if there be diarrhœa, the most experienced observer will wait for further developments before he decides whether he has to deal with a case of septicæmia or of puerperal malarial fever. But in malarial fever, a fall of temperature of three or four degrees is always attended with a corresponding decline of other symptoms, which is not the fact in septicæmia, and the latter is rarely accompanied by pain of the head, back or limbs. The sensibilities are blunted instead of being morbidly acute. When the disease first manifests itself after the sixth or eighth day, I think, however closely the symptoms may resemble septicæmia, the fear of this may, with a considerable degree of certainty, be dismissed. I have never seen a case which would be likely to be mistaken, by a competent and intelligent observer, for pyæmia, even when developed late during the puerperal period. I have in several instances seen this affection mistaken for puerperal fever. But puerperal fever generally appears between the first and third day after delivery, very rarely after the fifth day, while the chills are not recurrent, nor are there marked remissions of the symptoms; while usually with the chills there is a sudden development of abdominal pain, often vague and undetermined in its seat, but generally beginning in the hypogastrium, and the pulse is constantly frequent, with no periods of several hours of remission. So recalling these facts, I feel safe in asserting that I have never been inclined to believe that any case of malarial fever that I have met with might be a case of puerperal fever.

In three or four instances, I have been for a time in doubt whether the case was one of phlebitis or of malarial fever, as they have many symptoms in common; but the absence of the physical signs of the former, and a careful analysis of the symptoms and their order of development, have eventually made the diagnosis clear. This was notably the fact in one of my own cases, where the disease was first manifested on the sixth day after confinement. The cure of this case was finally effected by the administration of quinine hypodermically in very large doses. This caused abscesses in the legs where the quinine was injected, but in no other way could a sufficient quantity of this agent be introduced into the system.

It is unnecessary to say that malarial fever may be developed during the progress of any of the local phlegmasiæ, or may be complicated by them, but I have never happened to meet with such, except in two instances, where mastitis seemed to bring out the full effect of the malarial poison.

In five cases, secondary hæmorrhage occurred after the twelfth day, apparently as a result of the malarial fever. I have already alluded to one where the hæmorrhage was alarming, and this happened in one other case. This also occurred in a case reported to the Obstetrical Society of New York, by Dr. H. T. Hanks, and published in its Transactions in the *American Journal of Obstetrics*, January, 1880. In a note recently received from Dr. Hanks, he states that since the case was reported he has been obliged to resort to quinine and elixir vitriol to reduce a very high fever. In the other three cases, the hæmorrhage came on with a gush, but small in amount, and continued in a slight degree for several days. In these the vaginal discharge became very offensive during the last two or three days of the hæmorrhage, which I attributed to the slow oozing of blood in so small an amount that it was retained in the uterine cavity, where decomposition took place before a sufficient quantity was accumulated to force the uterus to expel it. In one case, three days after the hæmorrhage, purpura was developed, and there was some oozing of blood from the buccal and nasal mucous membranes. This patient was treated with large doses of quinine, and tinct. of the chloride of iron and chlorate of potash. She eventually recovered, but her convalescence was very slow, demanding nearly three months, and indeed was not complete until after a visit of some months to Europe. I have seen no case in which the urine showed the presence of blood or its constituents, or that form described by Michel, which he proposes to call hæmorrhagic malarial fever, unless the one last mentioned would come under this category.

In four of the seventeen cases which I have seen in consultation, the most prominent reason assigned for my being asked to see the patient was that she had puerperal mania, but in three of them, I regarded the cerebral disturbances as delirium rather than mania. In one, however, a lady in Jamaica, Long Island, whom I saw with my namesake, Dr. Barker, of that place, it seemed to be mania, as the mental excitement continued through the remissions and in some degree for several days.

In another case, active delirium commenced with the first chill; this was the 11th day after confinement, and the next day when I first saw her, she was in a state almost of semi-coma. She could be roused to some consciousness, but was sullen and taciturn. At first I was certain that it was uræmia, although an examination of the urine was wholly negative, and the renal secretion was sufficient and of good specific gravity, 1.020, yet I could not resist the conviction that it was due to this cause, and advised Clutterbuck's elaterium in doses of an eighth of a grain every half-hour, until free catharsis was produced. She took six doses, when she began to vomit, and was purged excessively. The next morning, her condition was very bad, she was extremely feeble, her pulse was very rapid and thready, and she would swallow nothing, even when her mouth was forced open and liquids were placed in it. I now became convinced that the symptoms were due to malaria; but it was with the greatest difficulty that I could persuade my friend and confrere to accept my views. But feeling that the case was hopeless, he reluctantly consented that the treatment suggested by me should be adopted. In the first place, one-eighth of a grain of morphia with one-sixtieth of a grain of atropia, was administered hypodermically. Then as soon as it could be procured, one drachm of Lente's solution of quinine was given hypodermically, and it was decided to repeat this every third hour until the effects of the quinine were very decided. In twenty-four hours, she thus received into the system hypodermically eighty grains of quinine. After the fifth administration, my friend began to see positive evidences of the effect of the treatment, and became as enthusiastic in its favor as he before had been opposed to it, and administered it twice after I probably would have ceased its use. The next day, when I saw her, she was perfectly rational, readily took nourishment, and her general condition was greatly improved. I saw her again on the following day, when my attendance ceased, but my friend informed me that her convalescence was very rapid.

It is worthy of remark that this patient never complained of headache, deafness, ringing in the ears, or any other symptom of cinchonism. The tolerance of quinine in these cases of puerperal malarial fever is very remarkable, as I have often had occasion to observe.

But one of the cases that I have seen has terminated fatally. This was a patient of Dr. William H. Hall, who died the forty-seventh day after confinement. Dr. Hall has most kindly furnished me with a full history of the case, but time will only permit me to read a brief abstract of it.

The patient had been married a year, but had spent three years before in Rome, where she had Roman fever. Her mother thinks that she had contracted malaria before this while at school. She was delivered of a healthy girl after a normal labor of fifteen hours. For the ten days following, when the doctor ceased to visit her, he writes, "The clinical history was devoid of incident, and as purely physiological as any case that I ever witnessed, and at my last visit, I found her sitting up, and eating with relish a beef steak. On the thirteenth day after confinement, without any premonition whatever, or without any exposure on her part, she was seized with a violent chill. Examinations made with the utmost care and solicitude, revealed nothing abnormal as to her puerperal functions." Dr. Hall gave at first thirty grains of quinine, which was followed by an abatement of the fever. But the chill returning the next afternoon, followed by fever, twenty grains of quinine were given, and the same dose was repeated the next morning and evening. There was, however, no abatement of the fever until the third night, about midnight. The quinine was continued in ten-grain doses every eighth hour. This was kept up for two days, when the interval between the doses was lengthened to twelve hours. Dr. Hall regarded the case as one of malarial remittent fever, as did also Drs. Thomas, Metcalf, and myself who at different times saw the patient with him. Dr. Thomas advised, "That the quinine should be given freely and persistently ;" and for many days she averaged one drachm of quinine a day, sometimes taking more. At no time were there any puerperal symptoms, except that she had a moderate secondary hæmorrhage, and for some days after, the vaginal discharges were offensive, probably due to the retention of small clots in the uterine cavity. A moderate degree of cystitis was also developed, and considerable leucorrheal discharge. During her illness, the patient received all the auxiliary treatment which symptoms indicated, in addition to the large doses of quinine. In the latter part of the illness, Warburg's tincture was substituted for the quinine, and "for some days this was followed by manifest improvement. There was no chill for three days, and but very little fever, and all took fresh hope ;" but this proved illusive, as we have seen.

This patient had evidently for years been saturated with malarial poison, and the puerperal period developed an explosion of its effects which no known anti-malarial agent could overwhelm.

As the treatment of malarial fever is now so well settled, and every physician of intelligence and sound practical sense perfectly appreciates the necessity for and the kind of auxiliary treatment which the symptoms peculiar to each individual case may require, I shall say but little in regard to this. For nearly two years past, in those cases where the stomach will tolerate it, I have found Warburg's tincture much more effective and speedy in producing the results desired than the largest doses of quinine.

My method of giving it is this : I prescribe it in half-ounce doses once in four hours until the fever has entirely abated. It is then continued in doses gradually diminishing to two and one drachms, until convalescence is perfectly established. If there be the least threatening of a recurrence, as shown by malaise, evanescent pains in different parts of the body, headache, helplessness, or loss of appetite, I direct that a full dose should be immediately taken, and that I shall be at once informed of her condition.—FORDYCE BARKER.

PUERPERAL METRITIS—*See Metritis, Puerperal.*

PUERPERAL PERITONITIS.—*Definition.*—Inflammation of the pelvic peritoneum, spreading often to the intestinal peritoneum, and occasionally to the pleura.

Causes.—Chill, septicæmia, unskilled operations, constipation, purgatives, incautious getting up.

Symptoms.—A severe rigor, countenance very anxious and pinched, abdominal pain, loss of appetite and sleep, arrest of lochia.

Signs.—High temperature, pulse frequent, small, and often hard ; great hypogastric tenderness, with tympanites ; tongue dry, red, and brown in middle.

Diagnosis.—From metritis by pain being more widely spread, and tenderness not limited to uterus ; from cellulitis by absence of frequent rigors.

Prognosis.—Unfavorable.

Treatment.—Leeches to abdomen when pulse will bear them, calomel and opium in large doses ; the opium may be pushed to narcotism ; hot injections, continuous poultices to abdomen ; quinine in large doses, veratrum viride nourishment in small quantities, and often ; if strength fails, alcohol. See also Peritonitis.—HEYWOOD SMITH.

PUERPERAL PELVIC CELLULITIS AND PELVIC PERITONITIS.—*These Diseases have been Recognized from the Earliest Times.*—From the earliest time the occurrence after parturition of severe forms of inflammatory diseases in and about the pelvis, frequently ending in suppuration, has been well known. It is only of late years, however, that these diseases have been made the subject of accurate clinical and pathological investigation, and that their true nature has begun to be understood. Nor is our knowledge of them as yet by any means complete. They merit careful study on the part of the accoucheur, for they give rise to some of the most severe and protracted illnesses from which puerperal patients suffer. They are often obscure in their origin and apt to be overlooked, and they not rarely leave behind them lasting mischief.

They are not Limited to the Puerperal State.—These diseases are not limited to the puerperal state. On the contrary, many of the severest cases arise from causes altogether unconnected with child-bearing. These will not be now considered, and this chapter deals solely with such forms as may be directly traced to child-birth.

Two Distinct Forms of Inflammatory Diseases are Met With.—Recent researches have demonstrated that there are two distinct varieties of inflammatory disease met with after labor, which differ materially from each other in many respects. In one of these, the inflammation affects chiefly the connective tissue surrounding the generative organs contained within the pelvis, or extends up from it beneath the peritoneum, and into the iliac fossæ. In the other, it attacks the portion of the peritoneum which covers the pelvic viscera, and is limited to it.

Variety of Nomenclature which has been Adopted.—So much is admitted by all writers, but great obscurity in description, and consequent difficulty in understanding satisfactorily the nature of these affections, have resulted from the variety of nomenclature which different authors have adopted.

Thus the former disease has been variously described as pelvic cellulitis, peri-uterine phlegmon, para-metritis, or pelvic abscess, while the latter is not unfrequently called peri-metritis, as contra-distinguished from para-metritis. The use of the prefix *para* or *peri*, to distinguish the cellular or peritoneal variety of inflammation, originally suggested by Virchow, has been pretty generally adopted in Germany, and has been strongly advocated in this country by Matthews Duncan. It has never, however, found much favor with English writers, and the similarity of the two names is so great as to lead to confusion. I have, therefore, selected the terms "pelvic peritonitis," and "pelvic cellulitis," as conveying in themselves a fairly accurate notion of the tissues mainly involved.

Importance of Distinguishing the Two Classes of Cases.—The important fact to remember is that there exists two distinct varieties of inflammatory disease, presenting many similarities in their course, symptoms and results, often occurring simultaneously, but in the main distinct in their pathology, and capable of being differentiated. Thomas compares them—and, as serving to fix the facts on the memory, the illustration is a good one—to pleurisy and pneumonia. "Like them," he says, "they are separate and distinct, like them affect different kinds of structure, and like them they generally complicate each other." It might, therefore, be advisable, as most writers on the disease occurring in the non-puerperal state have done, to treat of them in two separate chapters. There is, however, more difficulty in distinguishing them as puerperal than as non-puerperal affections, for which reason, as well as for the sake of brevity, I think it better to consider them together, pointing out, as I proceed, the distinctive peculiarities of each.

Seat of Disease—When attention was first directed to this class of diseases, the pelvic cellular tissue was believed to be the only structure affected. This was the view maintained by Nonat, Simpson, and many modern writers. Attention was first prominently directed to the importance of localized inflammation of the peritoneum, and to the fact that many of the supposed cases of cellulitis were really peritonitic, by Bernutz. There can be no doubt that he here made an enormous step in advance. Like many authors, however, he rode his hobby a little too hard, and he erred in denying the occurrence of cellulitis in many cases in which it undoubtedly exists.

Etiology.—The great influence of child-birth in producing these diseases has long been fully recognized. Courty estimates that about two-thirds of all the cases met with occur in connection with delivery or abortion, and Duncan found that out of 40 carefully observed cases, 24 were associated with the puerperal state.

The Inflammation is Secondary and Never Idiopathic.—It is pretty generally admitted by most modern writers that both varieties of the disease are produced by the extension of inflammation from either the uterus, the Fallopian tubes, or the ovaries. The point has been especially insisted on by Duncan, who maintains that the disease is never idiopathic, and is "invariably secondary either to mechanical injury, or to the extension of inflammation of some of the pelvic viscera, or to the irritation of the noxious discharges through or from the tubes or ovaries."

They are often intimately connected with Septicæmia.—Their intimate connection with puerperal septicæmia is also a prominent fact in the natural history of the diseases. Barker mentions a curious observation illustrative of this, that when puerperal fever is endemic in the Bellevue Hospital in

New York, cases of pelvic peritonitis and cellulitis are also invariably met with. Olshausen has also remarked that in the Lying-in Hospital at Halle, during the autumn vacation, when the patients are not attended by practitioners, and when, therefore, the chance of septic infection being conveyed to them is less, these inflammations are almost always absent. As inflammation of the lining membrane of the uterus, of the vaginal mucous membrane, and of the pelvic connective tissue, are of very constant occurrence as local phenomena of septic absorption, the connection between the two classes of cases is readily susceptible of explanation. Schroeder, indeed, goes further, and includes his description of these diseases under the head of puerperal fever. They do not, however, necessarily depend upon it; for, although it must be admitted that cases of this kind form a large proportion of those met with, others unquestionably occur which cannot be traced to such sources, but are the direct result of causes altogether unconnected with the inflammation attending on septic absorption, such as undue exertion shortly after delivery, or premature coition. Mechanical causes may beyond doubt excite the disease in a woman predisposed by the puerperal process, but they cannot fairly be included under the head of puerperal fever.

Seat of the Inflammation in Pelvic Cellulitis.—Abundance of areolar tissue exists in connection with the pelvic viscera, which may be the seat of cellulitis. It forms a loose padding between the organs contained in the pelvis proper, surrounds the vagina, the rectum, and the bladder, and is found in considerable quantity between the folds of the broad ligaments. From these parts it extends upwards to the iliac fossæ, and the inner surface of the abdominal parietes. In any of these positions it may be the seat of the kind of inflammation we are discussing. The essential character of the inflammation is similar to that which accompanies areolar inflammation in other parts of the body. There is first an acute inflammatory œdema, followed by the infiltration of the areolæ of the connective tissue with exudation, and the consequent formation of appreciable swellings. These may form in any part of the pelvis. Thus we may meet with them, and this is a very common situation, between the folds of the broad ligaments, forming distinct hard tumors, connected with the uterus, and extending to the pelvic walls, their rounded outlines being readily made out by bi-manual examination. If the cellulitis be limited in extent, such a swelling may exist on one side of the uterus only, forming a rounded mass of varying size, and apparently attached to it. At other times the exudation is more extensive, and may completely or partially surround the uterus, extending to the cellular tissue between the vagina and rectum, or between the uterus and the bladder. In such cases the uterus is imbedded and firmly fixed in dense, hard exudation. At other times, the inflammation chiefly affects the cellular tissue covering the muscles lining the iliac fossæ. There it forms a mass, easily made out by palpation, but on vaginal examination little or no trace of the exudation can be felt, or only a sense of thickness at the roof of the vagina on the same side as the swelling.

Seat of the Inflammation in Pelvic Peritonitis.—In pelvic peritonitis the inflammation is limited to that portion of the peritoneum which invests the pelvic viscera. Its extent necessarily varies with the intensity and duration of the attack. In some cases there may be little more than irritation, while more often it runs on to exudation of plastic material. The result is generally complete fixation of the uterus, and hardening and swelling in the roof of the vagina; and the lymph poured out may mat together the surrounding viscera, so as to form swellings, difficult, in some cases, to differentiate from those resulting from cellulitis. On post-portem examination the pelvic viscera are found extensively adherent, and the agglutination may involve the coils of the intestine in the vicinity, so as sometimes to form tumors of considerable size.

Relative Frequency of the Two Forms of Disease.—The relative frequency of these two forms of inflammation as puerperal affections is not easy to ascertain. In the non-puerperal state the peritonitic variety is much the more common, but in the puerperal state they very generally complicate each other, and it is rare for cellulitis to exist to any great extent without more or less peritonitis.

Symptomatology.—The earliest symptom is pain in the lower part of the abdomen, which is generally preceded by rigor or chilliness. The amount of pain varies much. Sometimes it is comparatively slight, and it is by no means rare to meet with patients, who are the subjects of very considerable exudations, who suffer little more than a certain sense of weight and discomfort at the lower part of the abdomen. On the other hand, the suffering may be excessive, and is characterized by paroxysmal exacerbations, the patient being comparatively free from pain in several successive hours, and then having attacks of the most acute agony.

Pain is Probably Symptomatic of Peritoneal Complications.—Schroeder says that pain is always a symptom of peritonitis, and that it does not exist in uncomplicated cellulitis. The swellings of cellulitis are certainly sometimes remarkably free from tenderness, and I have often seen masses of exudation in the iliac fossæ, which could bear even rough handling. On the other hand, although this is certainly more often met with in non-puerperal cases, the tenderness over the abdomen is sometimes excessive, the patient shrinking from the slightest touch. The pulse is raised, generally from 100 to 120, and the thermometer shows the presence of pyrexia. During the entire course of the disease both these symptoms continue. The temperature is often very high, but frequently it varies from 100° to 104°, and it generally shows more or less marked remissions. In some cases the temperature is said not to be elevated at all, or even to be subnormal, but this is certainly quite exceptional. Other signs of local and general irritation often exist. Among them, and most distinctly in cases of peritonitis, are nausea and vomiting, and an anxious pinched expression of the countenance, while the local mischief often causes distressing dysuria and tenesmus. The latter is especially apt to occur when there is exudation between the rectum and vagina, which presses on the bowel. The passage of fæces, unless in a very liquid form, may then cause intolerable suffering.

The Symptoms are Often Insidious in Their Onset.—Such symptoms may show themselves within a few days after delivery, and then they can hardly fail to attract attention. On the other hand, they may not commence for some weeks after labor, and then they are often insidious in their onset, and apt to be overlooked. It is far from rare to meet with cases six weeks or more after confinement, in which the patient complains of little beyond a feeling of malaise and discomfort, and in which, on investigation, a considerable amount of exudation is detected, which had previously entirely escaped observation.

Results of Physical Examination.—On introducing the finger into the vagina it will be found to be hot and swollen, in come cases distinctly œdematous, and on reaching the vaginal cul-de-sac the existence of exudation may generally be made out. The amount of this varies much. Sometimes, especially in the early stage of the disease, there is little more than a diffuse sense of thickness and induration at either side of, or behind, the uterus. More generally, careful bi-manual examination enables us to detect a distinct hardening and swelling, possibly a tumor of considerable size, which may apparently be attached to the sides of the uterus, and rise above the pelvic brim, or may extend quite to the pelvic walls. The examination should be very carefully and systematically conducted with both hands, so as to explore the whole contour of the uterus before, behind, and on either side, as well as the illiac fossæ; otherwise a considerable exudation might readily escape detection. When the exudation is at all great, more or less fixity of the uterus is sure to exist, and is a very characteristic symptom. The womb, instead of being freely movable by the examining finger, is firmly fixed by the sarrounding exudation, and in severe forms of the disease is quite encased in it. More or less displacement of the organ is also of common occurrence.

The womb is generally fixed and often displaced. If the swelling be limited to one side of the pelvis or to Douglas's space, the uterus is displaced in the opposite direction, so that it is no longer in its usual central position.

The Two Forms of Disease Cannot Always be Distinguished.—The differential diagnosis of pelvic cellulitis and pelvic peritonitis cannot always be made, and, indeed, in many cases it is impossible, since both varieties of disease coexist. The elements of the differentiation generally insisted on are, the greater general disturbance, nausea, etc., in pelvic peritonitis, with an earlier commencement of the symptoms after labor. The swellings of pelvic peritonitis are also more tender, with more clearly-defined outline than those of cellulitis. When the cellulitis involves the iliac fossa the diagnosis is, of course, easy; and then a continuous retraction of the thigh on the affected side (an involuntary position assumed with the view of keeping the muscles lining the iliac fossa at rest), is often observed. When the inflammation is chiefly limited to the cavity of the pelvis, the distinction between the two classes of cases cannot be made with any degree of certainty.

Terminations.—Both forms of disease may end either in resolution or in suppuration. In the former case, after the acute symptoms have existed for a variable time, it may be for a few days only, it may be for many weeks, their severity abates, the swellings become less tender and commence to contract, become harder and gradually absorbed; until, at last, the fixity of the uterus disappears, and it again resumes its central position in the pelvic cavity. This process is often very gradual. It is by no means rare to find a patient, even some months after the attack, when all acute symptoms have long disappeared, who is even able to move about without inconvenience, in whom the uterus is still immovably fixed in a mass of deposit, or is, at least, adherent in some parts of its contour. More or less permanent adhesions are of common occurrence, and give rise to symptoms of considerable obscurity, which are often not traced to their proper source.

Symptoms of Suppuration—When the inflammation is about to terminate in suppuration, the pyrexial symptoms continue, and eventually well-marked hectic is developed, the temperature generally showing a distinct exacerbation at night. At the same time rigors, loss of appetite, a peculiar yellowish discoloration of the face, and other signs of suppuration, show themselves. The relative frequency of this termination is variously estimated by authors. Duncan quotes Simpson as calculating it as occurring in half the cases of pelvic cellulitis, but states his own belief, that it is much more frequent.

Frequency of Suppuration.—West observed it in 23 out of 43 cases following delivery or absorption, and McClintock in 37 out of 70. Schroeder says that he has only once seen suppuration in 92 cases of distinctly demonstrable exudation, a result which is certainly opposed to common experience. Barker also states that in his experience suppuration in either pelvic peritonitis or cellulitis "is very rare, except when they are associated with pyæmia or puerperal fever." It is certain that suppuration is more likely to occur in pelvic cellulitis than in pelvic peritonitis. but it is unquestionably occurs, in this country at least, much more frequently than the statements of either of these would lead us to suppose.

Channels Through Which Pus May Escape.—The pus may find an exit through various channels. In pelvic cellulitis, more especially when the areolar tissue of the iliac fossa is implicated, the most common site of exit is through the abdominal wall. It may, however, open at other positions, and the pus may find its way through the cellular tissue and point at the side of the anus, or in the vagina, or it may take even a more tortuous course and reach the inner surface of the thigh. Pelvic abscesses not uncommonly open into the rectum or bladder, causing very considerable distress from tenesmus or dysuria. According to Hervieux, it is chiefly the peritoneal varieties which open in this way. Not unfrequently more than one opening is formed; and when the pus has burrowed for any distance, long fistulous tracts result, which secrete pus for a length of time, and are very slow to heal. Rupture of an abscess into the peritoneal cavity, especially of a peritonitic abscess, is a possible (but fortunately a very rare) termination and will generally prove fatal by producing generally peritonitis. In one case which I have recorded in the fifteenth volume of the "Obstetrical Transactions," suppuration was folloyed by extensive necrosis of the pelvic bones. Two similar cases are related by Trousseau in his "Clinical medicine," but I have not been able to meet with any other examples of this rare complication, which was probably rather the result of some obscure septicæmic condition than of extensive of the inflammation.

Prognosis.—The prognosis is favorable as regards ultimate recovery, but there is a great risk of the protracted illness which may seriously impair the health of the patient, especially if suppuration result. Hence it is necessary to be guarded in an expression of opinion as to the consequences of the disease. Secondary mischief is also far from unlikely to follow, from the physical changes produced by the exudation, such as permanent adhesions or mal-positions of the uterus, or organic alterations in the ovaries or Fallopian tubes.

Treatment.—In the treatment of both forms of disease the important points to bear in mind are the relief of pain, and the necessity of absolute rest; and to these objects all our measures must be subordinate, since it is quite hopeless to attempt to cut short the inflammation by an active medication.

Local Abstraction of Blood.—If the disease be recognized at a very early stage, the local abstraction of blood, by the application of a few leeches to the groin or to the hæmmorrhoidal veins, may give relief; but the influence of this remedy has been greatly exaggerated, and when the disease is of any standing it is quite useless. Leeches to the uterus, often recommended, are, I believe, likely to do more harm than good (unless is very skillful hands), from the irritation produced by passing the speculum.

Use of Opiates.—Opiates in large doses may be said to be our sheet anchor in treatment whenever the pain is at all severe, either by the mouth, in the form of morphia suppositories, or injected subcutaneously. In the not uncommon cases in which pain comes on severely in paroxysms, the opiates should be administered in sufficient quantity to lull the pain, and it is a good plan to give the nurse a supply of morphia suppositories (which often act better than any other form of administering the drug), with directions to use them immediately the pain threatens to come on. When there is much pyrexia large doses of quinine may be given with great advantage, along with the opiates.

Attention to the State of the Bowels.—The state of the bowels requires careful attention. The opiates are apt to produce constipation, and the passage of hardened faces causes much suffering. Hence it is desirable to keep the bowels freely open. Nothing answers this purpose as well as small doses of castor oil, such as half a teaspoonful given every morning.

To Warm and Moisten.—Warmth and moisture, constantly applied to the lower part of the abdomen, give great relief, either in the form of large poultices of linseed meal, or, if these prove too heavy, of spongio-piline soaked in boiling water. The poultice may be advantageously sprinkled with laudanum or belladonna liniment. I say nothing of the use of mercurials, iodide of potassium, and other so-called absorbent remedies, since I believe them to be quite valueless, and apt to divert attention from more useful plans of treatment.

Importance of Rest.—The most absolute rest in the recumbent position is essential, and it should be persevered in for some time after the intensity of the symptoms is lessened. The beneficial effect of rest in alleviating pain is often seen in neglected cases, the nature of which have been overlooked, instant relief following the laying up of the patient.

Counter-Irritation.—When the acute symptoms have lessened, absorption of the exudation may be favored, and considerable relief obtained, from counter-irritation, which should be gentle and long continued. The daily use of tincture of iodine until the skin peels, perhaps best meets this indication; but frequently repeated blisters are often very serviceable. This I believe to be a better plan than keeping up an open sore with savine ointment, or similar irritating applications.

Opening of Pelvic Abscesses.—When the suppuration is established the question of opening the abscess arises. When this points in the groin, and the matter is superficial, a free incision may be made, and here, as in mammary abscess, the antiseptic treatment is likely to prove very serviceable. The abscess, should, however, not be opened too, soon, and it is better to wait until the pus is near the surface. The importance of not being in too great a hurry to open pelvic abscesses has been insisted on by West, Duncan and other writers, and I have no doubt the rule is a good one. It is more especially applicable when the abscess is pointing in the vagina or rectum, where explanatory incisions are apt to be dangerous, and when the presence of pus should be positively ascertained before operating. We have in the aspirator a most useful instrument in the treatment of such cases, which enables us to remove the greater part of the pus without any risk, and the use of which is not attended with danger, even if employed prematurely. If it do not sufficiently evacuate the abscess, a free opening can afterwards be safely made with the bistoury. The surgical treatment of pelvic abscess is, however, too wide a subject to admit of being satisfactorily treated here.

Diet and Regimen.—The diet should be abundant, but simple and nutritious. In the early stages of the disease, milk, beef-tea, eggs, and the like will be sufficient. After suppuration a large quantity of animal food is required, and a sufficient amount of stimulants. The drain on the system is then often very great, and the amount of nourishment patients will require and assimilate, when a copious purulent discharge is going on, is often quite remarkable. A general tonic plan of medication will also be required and such drugs as iron, quinine, and cod-liver oil will prove useful.—W. S. PLAYFAIR.

PUERPERAL SEPTICÆMIA—*See Septicæmia, Puerperal.*

PURPURA.—*Definition.*—Extravasation of blood occurring as puncta, petechiæ, vibices, or ecchymoses, either spontaneously or in the course of various diseases.

Symptoms.—The following varieties have been described:

a. Purpura simplex consists in the occurrence of numerous petechiæ, or vibices, irregularly scattered over the body, usually most markedly on the legs, where there is a tendency to symmetry of the eruption. The disease is said to occur in debilitated persons, but is attended by little or no subjective trouble, and is not dangerous to life. When small papules appear between the hæmorrhages the affection is termed purpura papulosa.

b. Purpura rheumatica, or peliosis rheumatica, first described as a separate disease under the latter name by Schonlein, is characterized by rheumatic pains in and about the joints, together with an appearance of a rash, which is at first erythematous but soon becomes hæmorrhagic. Though provisionally classed with purpura, it ought rather to be considered a variety of erythema papulatum or nodosum, with which, according to Bazin and others, it is identical. According to Hebra it arises with dragging pains in the joints and some fever, followed in a few days by the eruption near the joints, or more especially on the abdomen and breast. The spots, round and flat, are only slightly raised, gradually fade, with the usual changes of color, and disappear, without desquamation, in a week.

The disease usually attacks strong and healthy persons between the ages of twenty and thirty, and more frequently males than females. It has never been seen in children or aged persons.

c. Purpura hæmorrhagica is a severe constitutional variety, in which the cutaneous extravasations are abundant and large, and accompanied by hæmorrhages into various organs and from mucous surfaces. Marked anæmia and asthenia are induced by the severe losses of blood, and death is not an infreqent result.

The so-called purpura fibrilis is usually only a purpuric rash that appears in the course of one of the acute infectious diseases.

Diagnosis.—A petechial rash, not occurring in the course of one of the exanthemata, may be mistaken for: 1. Fleabites; 2. Scurvy.

Fleabites are most abundant where the folds of the clothes are thick, as on the neck, wrists, waist, and ankles; while purpura affects the lower limbs pre-eminently, and has no special predilection for other sites. It is also hæmorrhagic from the beginning, and does not appear as a roseolar spot, or wheal, with a central red dot.

The following table will show the points of difference from scurvy.

SCURVY.	PURPURA.
1. Is due to privation from vegetables and to depressing circumstances, and is cured by lime juice and fruit.	1. Is not produced by want of vegetables, and lime juice has no influence on its course.
2. Affects usually many persons at the same time.	2. Occurs sporadically.
3. The gums become spongy, the teeth loose, and painful subcutaneous ecchymoses, prone to suppuration, may occur.	3. No affection of gums or painful ecchymoses.
4. Is attended with great prostration and a peculiar dusky pallor of skin.	4. Prostration only proportionate to loss of blood; skin anæmic.
5. Death occurs rarely from hæmorrhage, usually from serous effusions or septicæmia.	5. Death results from asthenia or syncope, the result of hæmorrhage.

Prognosis.—Purpura simplex and rheumatica are affections of slight gravity, and as a rule tend towards spontaneous recovery. Purpura hæmorrhagica is serious in proportion to the amount of internal bleeding; it often resists treatment, and proves fatal by anæmia and exhaustion or syncope.

Treatment.—In the milder forms of purpura, rest in bed, nutritious diet, and tonics are all that is needed.

In purpura hæmorrhagica various drugs, chiefly metallic astringents and those which act on the blood vessels, have been used; of these, tinctura ferri perchloridi, in doses of xx to xxx drops three times a day, either alone or with ergot and digitalis, gives the best results.—MALCOLM MORRIS.

PUSTULE, Malignant—*See Malignant Pustule.*

PYÆMIA.—A disease characterized by remittent fever and the formation of multiple collections of pus in various parts of the body. It is a near ally of septicæmia and of ordinary surgical fever, but the scattered abscesses are characteristic.

Causes.—The immediate cause is granted to be the absorption of pus or of septic material into the blood. It is still disputed whether pus, in order to produce pyæmia, must be putrifying; and it is still uncertain whether the immediate cause of pyæmia can be absorbed through the mucous membranes, or whether it can enter only through an open wound. Advocates of the germ theory suppose that almost every case of pyæmia is due to the entrance of microscopic germs into open wounds, and produce strong experimental proofs of that belief; but how those germs cause the multiple abscesses is not so clear. The immediate cause of each scattered abscess ("metastatic" abscesses they are often called) is venous thrombosis and embolism; but what is the exact way in which the thrombosis is brought about? Some of the abscesses near the original wound are merely terminations of lymphatic inflammations, a track of inflamed lymphatics being sometimes traceable to them from the wound. Cases of pyæmia sometimes occur apparently spontaneous in origin and are called "idiopathic pyæmia." It must be remembered that their idiopathic nature rests on negative evidence only.

Conditions predisposing to Pyæmia are (1) bad ventilation and foul air; (2) accumulation of many wounds in one ward; (3) neglect of having sick-rooms thoroughly and periodically cleansed; (4) dirty and careless dressing and nursing; (5) unnecessarily meddling with and disturbing injuries; (6) bad drainage; (7) other anologous conditions. A second set of causes belong more personally to the patient. They include (1) drunken habits, (2) old age, (3) weak constitution, (4), unmanageableness and restlessness. Many slight cases of feverishness have been converted into acute blood-poisoning by severe exercise, *e. g*, ascending a mountain. "You will find in every day's practice that fatigue has a larger share in the promotion or permission of disease than any other single causal condition you can name." (Paget). "After wounds, children are singularly free from pyæmia." (Paget).

Pathology.—The nature of the changes in the blood is unknown. Localities attacked are (1) joints, (2) viscera, (3) serous membranes, (4) mucous membranes, (5) skin; and to these may be added the veins, lymphatics, and cellular tissue throughout the rest of the body. In the viscera are found low inflammations and metastatic abscesses. The affected joints and serous cavities are inflamed and filled with pus. External to the joints are œdema and flushes of redness. The affected mucous membranes are inflamed, and may give vent to great discharge. This, in the case of the gastro-intestinal canal, causes diarrhœa and even vomiting. When the skin is affected, blood-poisoning usually shows itself as erysipelas (*quod vide*), or as pustular inflammation. Veins become the seat of thrombosis, with or without precedent inflammation. Jaundice and suppression of urine sometimes occur in the course of pyæmia.

Symptoms and course.—2. Of acute pyæmia, rigors and feeling of illness. Perhaps purging and vomiting, with or without jaundiced hue of skin. High temperature. Rapid and frequent pulse. Erisipelatous inflammation of neighborhood of wound. Tender and inflamed glands. Acute pneumonia or pleurisy. Finally, "the patient—flushed, anxious, restless, even delirious—is in a hopeless condition with prostration and rapid sinking."* Duration, about five or six days. 2. Sub-acute or chronic pyæmia: A typical case presents, successively, the following symptoms: wound dry and inflamed, its edges swollen. This local inflammation spreads. Pain and tenderness; burrowing of pus; fever; rigors; abscess forms near the wound; neighboring joint swells; other abscesses form. Large lymphatics and glands may inflame and suppurate. Fever continues; temperature rises and falls irregularly, high rises usually coincident with rigors. Distant joins swell. Progressive emaciation; yellow skin; no sleep; no appetite; despondency. Cough; pain in chest (indicating pleurisy or metastatic pneumonia). Tongue furred and dry. Bed-sores. Occasional delirium. Eyes dull. Finally, utter prostration and death. Duration of sub-acute pyæmia, two to four weeks; of chronic, one to five months.

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* Callender in Holmes's System.

Prognosis.—Of acute cases, practically hopeless. Chronic and mild cases may recover, especially if prime cause can be removed. Paget relates a case which lasted three years and finally recovered.

Treatment.—Chiefly prophylactic. It includes the whole art of treating wounds properly (*quod vide*). Cleanliness, quietness, etc. Antiseptic treatment. Hospitals properly situated, arranged, and ventilated; wards periodically cleansed and disinfected; clean bedding; obedient and sensible nurses. When pyæmia is actually developed, plenty of fresh air, diligent nursing, feeding with milk, eggs, etc.; cooling drinks; quinine (5-15 grains for a dose); morphia at night; hyposulphite of soda (gr. xx every two hours); warm baths and wrapping in blankets to produce copious diaphoresis. In chronic pyæmia amputation may be indicated. Liq. potassæ (ʒ j ter die) to remove pyæmic deposits (Paget). The commonest surgical causes of pyæmia are compound fractures.—C. B. KEETLEY.

PYELITIS
PYONEPHROSIS } —*See Kidneys, Suppurative Inflammation in Connection with.*

PYROPHOBIA—*See Fear, Morbid.*

PYROSIS.—This affection consists of a hot sensation in the stomach, with eructations of an acrid, burning liquid, which causes a distressing sensation in the parts over which it passes. Attention to diet, and the use of bitter absorbents will usually relieve when the disease is functional. Occasionally, it is symptomatic of organic disease of the stomach. Pyrosis also signified, of old, inflammation, gangrene, and a burn.—DUNGLISON.

PYURIA—*See Urine, Abnormal Conditions of.*

QUINSY—*See Tonsillitis.*

QUINSY, Malignant—*See Diphtheria.*

RACHITIS—*See Rickets.*

RADIUS, Fracture of—*See Fractures.*

RANULA.—A cystic tumor occurring in two situations, (1) close by frænum linguæ, (2) between mylo-hyoid muscle and mucous membrane. The latter form of ranula bulges externally between chin and hyoid bone. Contents: glairy, mucous fluid. But the second form may contain matter of a cheesy consistency.

Causes.—Ranulas are probably "retention cysts," but not caused by obstruction of Wharton's duct (Morrant Baker).

Treatment.—Open in the mouth, and cut away a part of the cyst-wall. Empty, and if the fluid re-collects, repeat the operation, in addition cauterizing the interior of the cyst.

RASHES, Medicinal—*See Medicinal Rashes.*

RASH, Surgical—*See Surgical Rash.*

RECTOCELE.—*Definition.*—Recto-vaginal hernia, a bulging forwards of the posterior vaginal wall, carrying the rectum with it.

Causes.—Obstinate constipation, ruptured perineum, relaxation of posterior vaginal wall.

Symptoms.—The pouch gets filled with fæces, producing pain, tenesmus, irritation, with mucous discharge from the bowels.

Signs.—After an enema the rectum can be explored, and the state of the case made out.

Diagnosis.—From symptoms and signs as above.

Prognosis.—Unsatisfactory.

Treatment.—Palliative by the use of air-ball pessary; cure where practicable by operation; posterior elytrorrhaphy and perineorrhaphy.—HEYWOOD SMITH.

RECTUM, Diseases of (for those of Anus, *vide* Anus).—Stricture, cancer, polypus, malformation, hæmorrhoids (*vide* Hæmorrhoids).

RECTUM, STRICTURE OF.—Two kinds, viz., Simple and Cancerous. For latter, *vide* Cancer of Rectum. SIMPLE STRICTURE.—*Causes.*—1. Contraction of simple inflammatory deposit in the walls of the rectum; 2, syphilis; 3, cicatricial contraction after operative procedures; 4, or after sloughing caused by pressure during parturition; 5, or after strumous, dysenteric, or other ulceration. The chronic inflammation which leads to stricture may be caused by the impaction of foreign bodies or by the constant irritation of hard fæces. *Pathology.*—The seat of a simple stricture is marked by a fibrous deposit, which may extend wholly or partially round the bowel. When slight, it lies usually in the submucous tissue; but often the whole thickness of the rectum is affected. The usual seat is from one inch to one inch and a half above the anus. Bowel above stricture dilated and hypertrophied. Secondary abscesses and fistulæ often form, as in case of stricture of urethra. *Signs.*—(1) Constipation, (2) burning pain on passing a stool, (3) straining at stool, (4) blood or mucus in stools, (5) patulous anus, (6) "tape-like" motions, (7) detection of a stricture by digital examination or by a bougie. The 2d, 3d 4th, and 5th signs mark the ulcerative stage; the 6th sign is not thoroughly reliable. Examine very gently, especially if using a bougie. Roughness may do fatal damage. Do not mistake for stricture, obstruction caused by mucous folds or by the pressure of pelvic tumors. Sooner or later the constipation ends in complete obstruction, which may come on with great suddenness. In advanced cases the general health breaks down under the influence of pain, dyspepsia, and anxiety. *Treatment.*—The prime agents are (1) dilatation by bougies, (2) incision. The latter is suited only for traumatic strictures close to the anus. Accessory means are, rest in bed, warm water enemata, regulated diet, morphia suppositories, and hip baths. Oil the bougies well, pass them every other day, gradually increasing the size. Patients, when cured, should continue to pass bougies or wax candles for themselves either weekly or bi-weekly or even daily, as may be found necessary. When complete obstruction occurs try rest, warm hip baths, warm, oily enemata and purgatives. The surgeon should not be in a hurry to operate, for these cases may relieve themselves after weeks of obstruction. The last resource is colotomy. When the stricture is high up, give the enemata through the long tube.

RECTUM, CANCER OF.—Usually scirrhus. *Pathology.*—Originates in proliferation of the glands of the mucous membrane. These "grow in the shape of tortuous and branched tubes; the calibre of the gland is often maintained; and they fill with mucus, and the cylinder cells may maintain this form and become very large."—Billroth. The infiltration and induration tend to surround the rectum with a hard ring. "Leaf-like proliferations commence close above the sphincter ani." Ulceration. "Inguinal and retro-peritoneal glands affected rarely and late." Ulceration may lay open bladder, urethra, vagina, peritoneum, hip-joint, &c. *Symptoms.*—At first, discharge of bloody mucus, and either constipation or diarrhœa. Defecation becomes more and more painful. Hæmorrhage becomes more serious. Digital examination usually reveals the hard, nodular ring, and perhaps ulceration. *Diagnosis.*—At first from hæmorrhoids, a little later from simple stricture. Usually settled by digital examination. *Treatment.*—1, Palliative; 2, Radical. 1. *Palliative.*—Anodynes, *e. g.*, morphia suppositories; afterwards morphia subcutaneously or by the mouth. Sometimes gentle aperients, warm water enemata. Enemata of cupri sulph. and opium, or of zinci chlor. (gr. j–ij–℥ j aquæ) may check foul discharges. Obstruction or extreme pain in defecation may demand colotomy. 2. *Radical.*—Excision of rectum for cancer has usually been condemned on account of the risk of dangerous hæmorrhage, and of opening the peritoneal cavity. But there are good reasons for taking the opposite view, *e. g.*, the neighboring glands are not secondarily affected at an early stage. Subject fully discussed by W. H. Cripps ("Cancer of the Rectum").

Rectum, Polypus of.—Uusually occurs in children, is adenomatous in structure, apt to signify its presence by occasional hæmorrhages, and may be snipped off with scissors. In exceptional cases a ligature may be considered necessary.

Rectum, Malformations of.—*Vide* Anus, Imperforate.

Rectum, Injuries of.—*Causes.*—May be classed as follows: (1) falls on sharp-pointed objects, *e. g.*, spikes; (2) sharp bodies swallowed, *e. g.*, fish-bones; (3) objects wilfully inserted; (4) obstetric processes; (5) surgical operations on neighboring parts. The first class usually recover thoroughly, unless fatal through complication with injury to more serious parts, such as the peritoneum. The causes of the 2d and 3d class require immediate removal with the aid of fingers, forceps, speculum, plenty of oil, &c. The 3d and 4th class of cases are apt to produce troublesome fistulæ. They should be treated with as little delay as possible. *Vide* Vaginal Fistulæ.—C. B. Keetley.

RED GUM—*See Strophulus.*

REFRACTION of the eye signifies the influence exercised by the transparent media upon rays of light entering it.

Emmetropia signifies normal refraction.

Ametropia signifies abnormal refraction, and may be divided into (1) Myopia, (2) Hypermetropia, (3) Astigmatism.

Emmetropia is that condition of refraction in which rays from distant objects, and which are practically parallel, come to a focus upon the retina when the eye is at rest, that is when accommodation is relaxed. The Emmetropic eye cannot see near objects without increasing the convexity of the crystalline lens, because the rays from near objects are divergent, and would therefore focus behind the retina. This change of shape in the lens is affected by the ciliary muscle, and is called accommodation.

The furthest distance of distinct vision in any state of refraction is called the far-point, the shortest distance of distinct vision is the near-point. The near-point and the far-point are found by means of test types. Those of Snellen and Jæger are in common use. The distance between the near-point and the far-point is called the range or amplitude of accommodation. It is the distance over which the eye has command by means of its accommodation.

Accommodation, as we have seen, depends upon the contractility of the ciliary muscle, and upon the elasticity of the crystalline lens. Now, as age advances, the ciliary muscle gradually loses its contractility, and the lens its elasticity. So that in emmetropia the near point gradually recedes from the eye. This recession commences at about the age of ten. Thus at the age of ten years the amplitude of accommodation is equal to a lens.

of 14 D., and the distance of the near-point from the eye is 7 centimetres; at fifteen years the distance is 8 c.m.; at twenty years it is 10 c.m.; at thirty years it is 14 c.m.; at forty years it is 22 c.m.; at fifty years it is 40.5 c.m.

The emmetropic eye, therefore can read No. 6 of Snellen's test types at the distance of 6 metres without the aid of either convex or concave lens ($V=6\text{-}6$) at all ages. It can read No. 1 of Snellen's test types for reading as near as 7 centimetres up to the tenth year of age, but after that time there is a gradual recession of this near-point. At the age of forty years the near-point is 22 c.m.

Presbyopia (Old Sight) is that condition in which the near-point has so far receded as to cause discomfort in reading and fine work. The distance is about 22 c.m. (8 inches). In the normal eye this distance (see Emmetropia) is reached at about forty years, so that after that age all fine work, such as reading, needlework, &c., must be held at more than 22 c.m. from the eye. This inconvenience is easily overcome by prescribing convex lenses to be worn for reading and fine work. The following table will show the strength of the lens required by the normal eye at different ages, to correct for presbyopia:

Age.	Strength of Spherical Convex Lens in Dioptres.
40	0
45	1
50	2
55	3
60	4
65	4.5
70	5.5
75	6
80	7

In hypermetropia, presbyopia comes on earlier than in emmetropia, because the hypermetropia has to be neutralized before any accommodation is available for near vision. Thus, suppose a hypermetrope of 2 dioptres, what strength of lens would be required to correct his near vision at the age of fifty? He will require first 2 D. to correct the hypermetropia, and, by the above table, we see that 2 D. would be the strength of lens required if he were emmetropic. Therefore, $2+2=4$ D., or let x be the amount of hypermetropia expressed in dioptres, and x^1 the strength of lens required according to age, then x D.$+x^1$ D. will be the strength of the spectacles required for near vision. In myopia, presbyopia comes on later than in emmetropia, because for the same amount of accommodation the near-point is always nearer than in the normal eye. In very high degrees of myopia (over 4.5 dioptres) the patient will never become so presbyopic as to require convex glasses for near vision, because in a state of repose the eyes are adapted for a shorter distance than 22 c.m. He may, however, require concave glasses for near as well as for distant vision (see Myopia). Suppose a myope of 3 D. sixty years old, what spectacles would he require? We see by the table that, if emmetropic, he would require 4 D., and we know that he has myopia $= -3$ D. Therefore $+4-3=+1$ D. will be the strength of spectacles required for near vision.

Myopia (Short Sight) is that condition of refraction in which parallel rays come to a focus in front of the retina, the eye being at rest. *Symptoms.*—Patient cannot see distant objects clearly, and if told to read small print (No. 1 of Snellen's test types) will hold it within the distance of his far-point from the eye. Vision improved by concave spherical lenses, made worse by convex lenses. Retinoscopy reveals a shadow which passes *in the same direction* as the reflected light. Ophthalmoscopy.—1, By direct examination with mirror alone, image of vessels of fundus seen at distance from eye, and moves in the opposite direction to the observer's head when the latter is moved from side to side. 2. By indirect examination, the optic disc appears smaller than in emmetropia, and appears to increase in size on withdrawing the lens used. 3. By direct examination, when the instrument is held close to the patient's eye the retinal vessels, optic disc, and other details of the fundus cannot be clearly seen without the intervention of a concave lens, the strength of the lens required for this purpose being a measure of the degree of myopia. In many cases a crescentic patch of yellowish-white appearance myopic crescent is seen on the outer side of the optic disc ; this is caused by atrophy of the choroid. In high degrees of myopia other patches of choroidal atrophy are often seen. Choroidal hæmorrhages, and hæmorrhages into vitreous, occasionally occur. Causes.—Too great length of globe. Too great curvature of cornea. Too high refractive power of media of eye. Hereditary tendency. Prolonged use of eyes in looking at close objects. *Treatment.*—Having accurately ascertained the degree of myopia, order spectacles to be worn. 1. To give clear vision of objects at a distance (Nos. 6 to 60 Snellen's at 6 metres). 2. To enable the patient to read small print (No. 1 Snellen) at the same distance as an emmetrope. In all cases of myopia below 6 or 7 dioptres, where the accommodation is good, the glasses which exactly correct the myopia should be used for near and for distant vision. They should be worn constantly. In most cases where the myopia is higher than 7 D., and in all cases where the accommodation is feeble, two kinds of spectables must be worn: one pair for distance, equal in strength to the degree of myopia, another pair for near vision, of lower power. The required strength of these is found in the following manner (Donders):—From the lens which exactly neutralizes the myopia deduct the strength of the lens whose focal length is equal to the distance which we wish the patient to work. Thus suppose a myope of 10 D. wishes to read No. 1 Snellen at 40 c. m. From 10 D. deduct the lens whose focal length is 40 c. m., viz., 2.50 D.; then $-10+2.50=-7.50$ D. is the strength of spectacle required. In prescribing for patients over 40, proper allowance must be made for presbyopia (see Presbyopia).

HYPERMETROPIA is that condition of refraction in which parallel rays come to a focus behind the retina—the eye being at rest. *Causes.*—1. Most commonly the axis of the eye is too short. 2. The curvature of the cornea or of the surface of the lens may be insufficient. 3. The refractive index of the media may be too low. The disease is frequently hereditary. *Symptoms.*—Since rays from a distant object (parallel rays) come to a focus behind the retina, it follows that rays from a near object (divergent rays) will be focused still further behind the retina, and therefore a hypermetrope is unable to see anything clearly, either distant or near, without using accommodation. If therefore the hypermetropia be slight, and the accommodation powerful, there will be no inconvenience, either for near or distant vision. But if the accommodation is failing, as it always does from age, and as it frequently does from disease, the patient cannot see near objects for long together without aching pains or sense of fatigue in the eyes, combined with dimness of vision. In high degrees of hypermetropia the greater part of the accommodation is required for distant vision, and the patient is never able to see near objects clearly. The symptoms therefore vary with the degree, and become more manifest as age advances. Hypermetropia is frequently an indirect cause of squint (see Strabismus), the objective symptoms are as follows :—

1. *Kerotoscopy* reveals a shadow which passes in the opposite direction to that of the reflected light. 2. *Ophthalmoscopy.*—Direct method at a good distance from the eye shows the image of vessels of fundus, and this

image moves in the same direction as the observer's head when the latter is moved from side to side. *Indirect method.*—Shows sides of disc to diminish on withdrawing the lens from patient's eye. *Direct method.*—When oblique mirror is used close to the patient's eye, and the accommodation both of patient and observer relaxed, no clear detail of fundus can be made out without the aid of a convex lens. The strength of the lens thus required to make quite clear the detail of fundus gives an exact estimate of the degree of hypermetropia. *By Means of Test-types and Test-glasses.*—See if patient can read Nos. 6 to 100 Snellen at 6 metres. Then, if he can read the same as well or better with a convex glass, the highest glass with which he gets the best vision is a measure of his manifest hypermetropia. In children, and in all cases where spasm of the ciliary muscle is suspected, it is necessary to paralyze the accommodation by atropine drops, in order to obtain the latent as well as the manifest, that is, the total hypermetropia. *Treatment.*—Having found the degree of hypermetropia, order spectacles to be worn as follows: 1. In children and young adults order the constant use of glasses both for near and distant vision; the strength of these should be equal to all the manifest hypermetropia plus half the latent. Patient may complain of inconvenience, but should persevere. 2. In persons over forty years of age order glasses as directed under presbyopia. (See Presbyopia). *Astigmatism* is regular or irregular. *Regular Astigmatism* is that condition in which the refraction is different in different meridians of the same eye; the two principal meridians being always at right angles to each other. *Irregular Astigmatism* is that condition in which there are different degrees of refraction in different parts of the various meridians. Regular astigmatism may exist in five different forms. 1. *Simple Myopic.*—One meridian emmetropic, and the other myopic. 2. *Simple hypermetropic.*—One meridian emmetropic, the other hypermetropic. 3. *Compound Myopic.*—Both meridians myopic, one more than the other. 4. *Compound Hypermetropic.*—Both meridians hypermetropic, one more than the other. 5. *Mixed.*—One meridian myopic, the other hypermetropic. *Causes.*—Chiefly unequal curvature of cornea, perhaps irregularity of lens also. Symptoms vary with the kind, and the degree of astigmatism. The lower forms often pass unheeded till rather late in life. The higher forms cause such fatigue and distress that the eyes are disqualified from prolonged exertion. Astigmatism must always be suspected when by testing with spherical lenses the patient cannot be made to read Nos. 6 or 9 Snellen at 6 metres (the fundus being otherwise healthy). When astigmatism is suspected, proceed to examine each eye carefully, as follows: 1. *Retinoscopy.*—The intensity, direction and velocity of a shadow will indicate the kind of error in each meridian. 2. *Ophthalmoscopy.*—By indirect examination, the optic disc appears oval instead of circular, and by withdrawing the used away from the patient's eye the disc appears to change its shape. By direct examination, the mirror being held close to patient's eye, the vessels of the different meridians may be seen with lenses of different powers, the difference between the powers of the lenses thus used being an exact measure of the degree of astigmatism. 3. Place patient at distance of six metres from Snellen's test types, and with spherical lenses correct the ametropia as far as possible. Then rotate in front of the correcting lens a stenopaic slit; by this means the two principal meridians will be found, and must be corrected seriatim. The difference of power between the lenses which correct these two meridians is an exact measure of the degree of astigmatism. The same object may be effected by the use of cylindrical glasses without the slit. 4. An excellent instrument for finding the two meridians is Tweedy's Optometer (see *Lancet*, October 28, 1876).

Whatever means be employed in diagnosis, cylindrical lenses should be prescribed which fully correct the astigmatism. The patient may not be able to see very much at first, but by the continued use of spectacles the vision will generally improve.

RELAPSING FEVER.—*Natural History.*—This disease is the result of a specific disease poison, which reproduces, multiplies, and propagates itself by *contagia*, emanating from the breath and exhalations during the course of a continued fever, having a very abrupt invasion and a short duration; but characterized by an abrupt relapse, occurring after an interval of about seven days of apparent health. There is no eruption on the skin. The fever is marked at the outset by rigors, chilliness, and severe headache, vomiting and often jaundice; a white, moist tongue, epigastric tenderness, confined bowels, enlarged liver and spleen, high-colored urine, a frequent, full, and often bounding pulse, pains in the back and limbs, restlessness, and occasionally delirium. These symptoms abruptly terminate by an exceedingly copious perspiration, between the fifth and the eighth day, and after a complete apyrectic interval (during which the patient may be so well to get up and walk about), an abrupt relapse supervenes on the fourteenth day, counting from the first commencement of the fever. The relapse runs a similar course to that of the primary paroxysms, and terminates between the third and the eighth day. In some cases a second, third, fourth, and even fifth relapse may occur. Death is very apt to happen from sudden syncope, especially after excessive perspiration, or from suppression of urine and coma.

The period of incubation is not fixed, and is more variable than that of typhus. It is on the whole shorter than that of typhus; and occasionally, as in typhus, there is scarcely any latent period at all, the symptoms commencing almost immediately after the first exposure to the poison. Five, nine, twelve, and sixteen days are the periods of incubation which have been observed. The seizure is most always sudden. Sometimes on waking in the morning, or when at business in the day, severe rigors at once come on, with extreme chilliness and frontal headache, much more severe in expression than in typhus. Febrile re-action quickly sets in, with a pulse so rapid as to range from 110° to 140° Fahr. The tongue is coated with a white fur; and often there is vomiting of green bitter fluid, with epigastric tenderness and great thirst. In a large proportion of the cases there is decided jaundice, or bronzing of the skin. The pains in the muscles and the joints are so severe as to resemble rheumatism. Temperature in the axilla ranges from 102° to 107 Fahr., accompanied with short rigors or slight sweating.

The thermometric phenomena differ from those of all other fevers. After the patient has continued in this fevered state for a period varying from five to eight days, a sudden change takes place, which is immediately preceded by an exacerbation of all the symptoms to an extreme degree, attended with great distress and restlessness. Suddenly a crisis ensues by a remarkable intermission of all the symytoms and a restoration to apparent health. This occurs generally on the seventh day, and its advent is rarely prolonged beyond the eighth. This crisis is commenced by a profuse perspiration; and occasionally a miliary eruption of vesicles covers the skin. More rarely the crisis is marked by epistaxis, as well as perspiration, or by profuse diarrhœa, catamenial discharge, or even hæmorrhage from the bowels. After either or several of these critical discharges have been established for a few hours, there is a complete and abrupt cessation of all the distressing symptoms, and the temperature may fall ten or twelve degrees in a few hours. The pulse quickly regains its normal standard, the tongue cleans, and the appetite and sleep return. Thus he may continue well for four or five days; although there are some who suffer greatly during this period from violent muscular pains in the limbs. During the crisis, also, symptoms of great depression are apt to come on.

About seven days after this critical change, or from the twelth to the twentieth day after the commencement of the illness, and very generally on the fourteenth day, a sudden relapse occurs, which is a characteristic peculiarity of this fever. It seems in every respect a repetition of the phenomena of the first seizure.

In the interval of convalescence, or of remission between the first and second attack, the pulse may become slow to an extreme degree, even to forty-five beats a minute—a source of danger of death from sudden syncope—but the moment the relapse commences, it again rises to 120 or more. The crisis of the relapse is generally reached in four or five days, when convalescence commences. The fever is a very exhausting one, and the patients may remain sickly for months, with pallid anæmic countenances, puffed ankles, palpitation, extreme debility, noises in the ears, dimness of vision, diarrhœa or dysentery. Excessive pains in the limbs are also common, and the joints may swell.

Fatal or troublesome complications may be induced by the disease, such as lobular inflammation of the lungs, bronchitis during the intermission, abscess of spleen or kidney, dropsy, parotitis, and a peculiar form of ophthalmia preceded by amaurosis, œdema of feet and ankles, falling off of the hair, and sometimes desquamation of the cuticle in severe cases.

Diagnosis.—This cannot be made positively during the primary fever. It resembles yellow, typhus and typhoid fevers at first. It may also be mistaken for acute rheumatism, when pains prevail and joints swell.

Treatment.—Let the bowels be efficiently opened in the first instance, by castor-oil or compound colocynth pill mass, combined with blue pill; or by blue pill combined with hyoscyamus at night, followed by a saline draught in the morning; further active purgation is to be avoided. Vomiting is best subdued by five grains of calomel and one grain of opium, to be followed by the use of milk and lime-water as a drink, with ice. If the patient has been in good health and robust previous to the attack, the violence of the headache may be subdued by leeches. The action of the kidneys ought to be maintained throughout by small doses of nitre—one or two drachms dissolved in two pints of barley water, acidulated with a drachm of dilute nitric acid, and sweetened with syrup, may be used up during the twenty-four hours, with as much more water as may be agreeable. Alcoholic stimulants must be given if there is debility from the first, and anæmic murmur or fainting. The surface of the body should be frequently sponged over with cold or tepid water, and the patient ought to keep his bed during the interval before the relapse.—WILLIAM AITKEN.

REMITTENT FEVER—*See Malaria.*

RETINA, Diseases of.—The healthy human retina is so transparent during life that it is hardly seen with the ophthalmoscope. The vessels of the retina are seen radiating from the optic disc. Inflammatory and other deposit in the retina are also seen when present. The chief diseases of the retina are: Hyperæmia, Retinitis, Detachment, Embolism of the central artery, Glioma, Cysts.

HYPERÆMIA.—Generally caused by overwork, especially if the patient be ametropic. Fundus looks too red, and optic disc has a pinkish, flushed appearance. *Treatment.*—Functional rest, local depletion by leeches or blister if necessary. Correction of ametropia by use of spectacles.

RETINITIS.—(*a*) Syphilitic, (*b*) Albuminuric, (*c*) Apoplectic, (*d*) Pigmented.

SYPHILITIC RETINITIS.—One of the many secondary symptoms of syphilis—generally occurring between six and eighteen months after infection—occurs in inherited as well as in acquired syphilis. Opthalmoscope *shows a grayish-white haze* around optic disc, patches of yellowish-white exudation over the fundus, generally more or less choroiditis, generally more or less turbidity of vitreous. *Treatment.*—Functional rest of eyes, general treatment for secondary syphilis.

Albuminuric Retinitis (Nephritic R.) may come on gradually with the advance of kidney disease, may be dependent on uræmia and occur in the later stages of kidney disease. May be caused by temporary albuminuria, as in that which occasionally occurs during pregnancy. In early stage sight may be unaffected. Ophthalmoscope shows a dull gray haze in central region of retina due to œdema, generally a few small patches of hæmorrhage scattered over fundus. Optic disc may be also swollen. In advanced stage sight generally affected in one or both eyes. Central region occupied by numerous dots, spots, or patches of an opaque white substance grouped around the yellow spot. Hæmorrhages are frequent, and usually have a striated appearance. Optic nerve sometimes inflamed (neuro-retinitis). Prognosis must be guarded. Treat disease of kidneys. Rest and protect eyes by cobalt-blue-glasses.

Retinitis Apoplectica.—From sudden hæmorrhage from a retinal vessel, from diseases of vessels, or of heart.

Retinitis Pigmentosa.—Characterized by a peculiar deposit of dark pigment—varying in pattern—usually commences at the periphery of the fundus, and gradually approaches the centre. Optic disc of a pale yellow color. Often associated with posterior polar cataract. Often occurs in several members of the same family. *Prognosis* bad. May remain stationary. May go on from bad to worse.

Detachment of Retinia may be partial or entire. Causes: (*a*) Elongation of coats of eyeball as in extreme myopia, (*b*) Diminution of vitreous, (*c*) Hæmorrhage or serous exudation between retina and choroid, (*d*) Tumors of choroid. *Symptoms.*—By direct examination the detached portion appears as a bluish-gray film bounded by a sharp line. The vessels traced from disc give a sudden bend at the line of detachment. The detached portion is seen to be pushed forwards, and the vessels upon it are tortuous, small, and of dark color. The field of vision is limited. *Prognosis* is unfavorable.

Glioma, a small round-celled growth proceeding from the granular layers of the retina, occurring generally in very young children. It is seen as a glistening white substance at the bottom of the eye, and if allowed to remain, it rapidly spreads along the optic nerve to the brain, and to the surrounding structures within the orbit. Secondary deposits may occur. *Treatment.*—Early excision of globe.—Henry Juler.

RETINITIS—*See Retina, Diseases of.*

RHEUMATALGIA—*See Chronic Rheumatism.*

RHEUMATIC FEVER—*See Acute Rheumatism.*

RHEUMATIC GOUT—*See Chronic Gout.*

RHEUMATISM, Acute—*See Acute Rheumatism.*

RHEUMATISM, Chronic—*See Chronic Rheumatism.*

RHEUMATISM, GONORRHŒAL.—An affection analogous to acute rheumatism, but associated with or consequent on gonorrhœa. It attacks patients who never suffer from rheumatism, except when they contract gonorrhœa, and sometimes it recurs in the same patient with every gonorrhœa he contracts. It commences either when the discharge continues profuse or when it has been more or less speedily suppressed, or after if has quite disappeared. The parts affected are generally the knee-joints, or the knee, ankle, and toe of one side. Rheumatic ophthalmia, as sclerotitis, is not unfrequent at the same time. When it extends to more joints than one, the first affected joint does not recover its normal condition, but continues after other joints have been implicated. It is rare for the heart to suffer. The sheaths of the great sciatic nerve sometimes suffer, when the pain along the course of the nerve is very obstinate (gonorrhœal sciatica). Women rarely suffer.—WM. AITKEN.

See also JOINTS, Diseases of.

RHEUMATISM, Muscular—*See Muscular Rheumatism.*

RHEUMATOID ARTHRITIS—*See Chronic Osteo-arthritis.*

RHINOSCLEROMA.—*Definition.*—A peculiar affection, of extremely chronic course, consisting in the formation, on the skin or mucous membrane around the anterior nares. of dense roundish tubercles, which have no tendency to ulcerate or undergo retrogression.

Symptoms.—An abstract of the description of Kaposi based on fifteen cases, is as follows: The tubercles, isolated or conglomerate, are either smooth, supple, and the same color as the normal skin, or bright or brownish-red and glossy. The epidermis over them is cracked and fissured, and from the rhagades a viscid secretion, drying into yellowish scabs, exudes. The nodules are somewhat elastic, seem cartilaginous to the touch, and are painful on pressure; they are imbedded in the skin, which is normal at their margins

The nodule, beginning slowly as a thickening and induration of the skin on the septum or edge of one of the alæ, extends gradually into the meatus, which it greatly narrows to the cheek, and to the upper lip, and causes great deformity.

Diagnosis.—1. From a syphilitic gumma it is distinguished by the extremely chronic course, absence of degeneration or ulceration, obstinate resistance to treatment, and the peculiar localization and restriction of the disease.

2. If the tumor be prominent, glistening, and covered with dilated vessels, it can be diagnosed from keloid only by the history and by microscopical examination.

Prognosis.—Though rhinoscleroma absolutely resists treatment, it is not fatal to life, and is not liable to grow rapidly, affect the constitution, or undergo ulceration. The deformity and the obstruction to the nares are the chief inconveniences arising from it.

Treatment.—Excision of the growth has hitherto been followed by recurrence, and all internal or local applications fail to remove it.—MALCOLM MORRIS.

RHINOSCOPY.—Examination of nares by aid of laryngeal mirror turned upwards in pharynx. Difficult. *Natural Causes of Difficulty.*—1. Irritability of pillars of fauces, and of posterior wall of pharynx. 2. Enlarged tonsils and uvula. 3. Insufficient distance between uvula and posterior wall of pharynx. *Rules.*—Same as those for Laryngoscopy (*quod vide*), up to Rule 6. Rule 7. Allow patient's tongue to remain at rest and untouched in the mouth. 8. Hold mirror like a pen and with the reflecting surface upwards. 9. Let its shank rest lightly on the dorsum of the tongue, but be very careful not to touch the base of the tongue. Shift the mirror slightly to right or left of uvula, according to which side it is desired to examine. 10. Direct patient to exhale quietly and continuously by the nostrils.

RIBS, Fracture of—*See Fractures.*

RICKETS.—Rachitis. A disease of early childhood manifested chiefly by abnormal softness of the bones and consequent deformity, and by backward development of the teeth.

Causes.—Improper feeding in infancy, especially giving young infants farinaceous food to supplement a scanty supply of milk. Other bad hygienic conditions probably assist,

Signs.—At first the little patient often has diarrhœa. He shrinks from being touched; for movement is painful. Head perspires. Kicking off bedclothes at night. Backward dentition. Laryngismus stridulus. Emaciation. The above symptoms are entirely or partially absent in older children. Disease usually commences in second year. The infant ceases to walk when disease is at its height. Deformity of chest (pigeon-breast) now takes place. Bow-legs, knock-knees, curvature of spine (lateral and antero-posterior), as well as, though more rarely, pelvic deformities occur when the patient walks about again. "Beading" of junctions of ribs with costal cartilages. Enlargement of wrists, knees, and ankles. Fontanelles remain open. Head grows too fast, face too slow; hence projecting brows. Large bellies;* frequently enlargements of liver and spleen. Bronchitis. The subjects of rickets in childhood will not, in later life, attain normal height.

Pathology.—Mineral constituents of bone not deposited in normal amount; but animal portions grow normally. Hence the bones soften, lacunæ enlarge, periosteum and epiphysial cartilages proliferate; and, as ossification does not keep pace with this, long bones are apt to be bent beneath the weight of the body, especially at the junction of their epiphyses with their shafts. For similar reasons the growing brain forces apart the cranial bones and keeps open the fontanelles. These changes near the epiphyses account for the beaded ribs, the enlarged wrists, and the deformed knees and shins. Also general thickening, with partial thinning of cranial bones. When the rachitis disappears, leaving a bent long bone, the concavity of the curved bone is eventually strengthened by deposit of a ridge of compact bone. Rachitic pelves are usually flattened antero-posteriorly. Femora curve forwards. Tibia and fibulæ usually bend forwards and outwards (chiefly at junction of lower epiphysis). Spine affected with general posterior curvature in early infancy, with lumbar lordosis in early childhood, and occasionally with lateral curvature. Thorax—"pigeon-breasted."

Diagnosis.—Quite easy, except in early stage.

Prognosis.—Sometimes fatal to very weakly infants. Recovery usual, but rarely without residual deformity.

Treatment.—Correct diet. Plenty of milk. Sufficient animal food. Codliver oil. Syrup of phosphates of iron and lime. Parish's chemical food. Vinum ferri. Cold sponging and dry rubbing. Fresh air. Splints and other mechanical contrivances to correct deformities. In severe cases, osteotomy, or forcible straightening of limbs under chloroform. Keep a young rickety child off its feet as much as possible without depriving it of fresh air and exercise. Sleep on a mattress.—C. B. KEETLEY.

RINGWORM—*See Tinea.*

RODENT ULCER—Rodent ulcer is considered by most Continental dermatologists to be merely a variety of epithelioma and several English observers have found the growth to present the microscopic structure of the latter disease; it presents, however, certain clinical characters that require a separate description.

Symptoms.—It begins as a small, smooth, pale papule or tubercle, situated usually on the upper half of the face; it gradually increases in size and, after lasting perhaps for many years, commences to ulcerate. An ulcer, with hard, sinuous edges, often irregular in outline and attended with little or no pain, but extending gradually in depth and area, is thus produced. Its base is said to be not granulated, but smooth, glassy, and dull reddish-yellow in appearance, and as the margin extends cicatrization occasionally takes place in the centre. Slowly invading the deeper parts, ulceration may expose even the bones of the face, but there is never any secondary glandular infiltration, and the general health is little affected.

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* An early sign of great value (Clement Lucas).

It occurs in persons past middle age, and usually in those advanced in life.

Diagnosis.—The main differences from ordinary epithelioma consist in the extreme chronic, painless course, the absence of glandular infiltration and cachexia, the tendency in some cases to cicatrization, and the less marked liability to recurrence if the disease be once thoroughly destroyed.

Treatment.—Complete destruction of the growth at any early stage by excision, by scraping, or by caustics, will often cure, and in all cases much retard the progress of the disease.—MALCOLM MORRIS.

ROSACEA—*See Acne Rosacea.*

ROSEOLA.—Much difference of opinion exists among dermatologists concerning the disease usually classed under this heading. Willan has described, under the name of roseola, a variety of rashes which are not recognized by all writers, and Hebra especially doubts their existence. There may be some difficulty in agreeing with Willan in the correctness of describing as separate affections R. infantilis, R. æstiva, R. autumnalis, R. annulata, but we shall mention a rash under the name of roseola which is by no means limited to one period of the year. A roseolous rash occurring in association with some of the acute infectious diseases, has been described under the head of these diseases.

Definition.—Roseola is an acute disease characterized by the production on the body of small rose-colored papules, and attended by very slight constitutional symptoms, which make their appearance at the same time as the rash.

Symptoms.—The rash consists of minute red and slightly elevated spots, scattered over the chest and neck, less often extending over the face and arms. They disappear temporarily on pressure, last but a few days, and fade, leaving a discoloration of the skin, but are sometimes followed by slight desquamation. Feverishness, headache, and occasionally vomiting are present at the commencement of the rash.

The constitutional symptoms are, however, slight; the temperature is seldom as high as 102° Fahr., and more often only just above normal. The fauces are frequently a little injected, but the redness does not extend beyond the edge of the soft palate, and the tonsils are not swollen. The tongue is slightly furred, and the papillæ along its edge are often prominent.

Diagnosis.—Roseola is often mistaken for scarlatina, and the diagnosis between the two affections is frequently a matter of considerable difficulty. They differ in the fact that the papules in the former are more widely separated from each other than those in the latter, and the skin intervening between the papules does not become red in roseola, as it does in scarlatina. The constitutional symptoms in roseola appear at the same time as the rash, while in scarlatina they precede it. Roseola is not infectious, and occurs more frequently among young women and children than other persons.

Prognosis.—Roseola always ends in recovery in a few days.

Treatment.—Nothing is required beyond rest for a day or two.—MALCOLM MORRIS.

ROTHELN.—*Definition.*—Rötheln is an acute infectious disease characterized by an eruption of red blotches on the skin, and attended by slight sore throat, slight coryza, and but little constitutional disturbance.

Symptoms.—After an incubation period, usually of about fourteen days, an eruption of oval or round spots, of a lighter red color than those of scarlatina or measles, appears on the chest, afterwards extending over the rest of the body, which vary in size from a pin's head to a threepenny piece. If the spots be large they are generally irregular in their shape; if small, they are more crowded together, and give an appearance more resembling scarlatina. The spots are generally discrete, but the rash is more often confluent on the face than on any other part of the body. The rash lasts about two days, and then fades, leaving a slight brown stain, which gradually dies away; it is rarely followed by desquamation, and, if at all, only in the form of minute scales. In rare cases the spots have been known to become vesicular. The constitutional symptoms which accompany the appearance of the rash are chiefly those of catarrh, and occur at the same time as the rash, or precede it by less than twelve hours, and not by some days, as in measles. The fauces are somewhat injected, and the tonsils may be even slightly swollen. The tongue is coated with white fur, through which a few large papillæ can be seen, more often at the tip than elsewhere. An important symptom which accompanies the others is the tendency of the lymphatic glands to become enlarged, which is more constantly the case in the neck, especially in those situated behind the sterno-mastoid muscle, but the glands of other parts of the body are not always exempt. Increase of temperature is rare in rötheln, or is limited to the first few hours of the disease.

Diagnosis.—Rötheln may be confounded with three other affections—scarlatina, morbilli, and roseola. The chief characteristic points between rötheln and scarlet fever and measles are shown under the head of Scarlet Fever. From roseola it can be best distinguished by the absence of coryza in the latter disease, and by the glandular enlargement which occurs in the former. See also under Measles.

Prognosis is always favorable.

Treatment.—No special treatment is required.—MALCOLM MORRIS.

RUBEOLA—*See Measles.*

RUPIA.—*Causation and Description.*—This is a disease which is described as beginning with flat bullæ, rarely, if ever, exceeding half an inch in diameter; first containing clear serum, then producing very thick greenish-brown or dark-colored scabs, and deep destructive ulceration. In some respects, therefore, the disease resembles pemphigus; it differs, however, form all ordinary forms of pemphigus in the fact that its bullæ are the result, not of superficial, but of deep seated disease. Rupia, indeed, is to be distinguished, not so much by the fact that it is a bullous disease, as by the character of its post-bullous stages. The rupial bulla slowly increases in size, is surrounded by a halo of congestion, and seated on a very slightly thickened base. A scab very soon forms, but while it is forming the bulla spreads at its margins, and fresh matter, which also soon coagulates, is produced around and under the first formed scab. In this way the rupial sore increases in diameter, the scab increases in thickness and prominence, and the subjacent ulcer becomes deeper and deeper. The resulting scab is always very thick, but sometimes flat and flaky, something like an oyster-shell (r. simplex), sometimes conical, like a limpet-shell, (r. prominens), sometimes irregular and rocky in form. On its removal, a fresh scab usually forms. The ulcers beneath such scabs are always deep and unhealthy-looking, and cause much destruction of tissue and permanent cicatrices. In some cases, those of children especially, the ulceration extends rapidly, presenting a phagedænic character (r. escharotica), or becomes distinctly gangrenous, when it is sometimes turned pemphigus gangrenosus. Rupial sores are generally scattered and few in number, and are not limited to any particular part of the person. They are, perhaps, most common on the buttocks and lower extremities.

Rupia rarely, if ever, happens in persons who are not obviously weakly and cachectic, and most frequently in those who have previously had syphilis. Indeed, there is some reason for regarding true rupia as essentially a syphilitic disease.

Treatment.—In the constitutional treatment of rupia, tonics of various kinds, iron, mineral acids, vegetable bitters, cod-liver oil, together with good diet and change of air, are all important. Anti-venereal remedies must not, however, be forgotten especially if there be a clear syphilitic history. For local treatment, poultices are necessary to aid in the detachment of the scabs; and the resulting ulcers must be treated not only with poultices but with stimulating or detergent ointments or washes and even in some cases with undiluted caustics, such as nitrate of silver, nitric acid, acid nitrate of mercury or other such agents.—J. SYER BRISTOWE.

SACRO-ILIAC DISEASE.—*Causes.*—Either struma or injury or both together.

Symptoms.—Local pain and tenderness. Pain during defecation, sometimes also during micturition. Peculiar posture, (vide figure in Sayre's Orthopædic Surgery, p. 333). Patient bends his body over from the affected side, "for the purpose of removing pressure from the diseased structures by bringing the weight of the limb to bear upon the ilium." Hence obliquity of the pelvis and apparent lengthening of limb on side of disease. When abscess forms it may appear either over the articulation, or in the buttock, loin, groin, or even rectum.

Diagnosis.—From neuralgia, sciatica, and Pott's disease, but, above all, from hip-disease. In sacro-iliac disease, if the pelvis be firmly fixed, the hip-joint can be moved normally and painlessly. In sufficiently advanced cases, the pelvis can be seen to be deformed: and when abscess has opened, a probe will often reach dead bone. Sayre's vertebrated probe may be useful. When the pelvis is not fixed, either lateral compression of trochanters, or abduction of thigh causes pain.

Prognosis bad.

Treatment.—Rest, extension and counter-extension. Sayre puts a thick-soled shoe on the foot of sound side so that the affected side swings free of the ground when the patient moves out of doors on crutches. Before suppuration takes place, use counter-irritation, especially the actual cautery. Dead bone, if detected by probe, should be removed, if possible. Cod-liver oil, iron. High, dry, and healthy localities.—C. B. KEETLEY.

SACRUM, Fracture of—*See Fractures.*

SALIVARY CALCULUS.—A concretion sometimes obstructs a salivary duct. Slit up the duct, if necessary, and remove it. May cause swelling of gland. Ducts usually affected are the sublingual or submaxillary.

SALIVARY FISTULA.—(1) from obstructed duct.

Treatment.—Establish an opening into the mouth by passing a seton right through the fistula into the mouth and tying its two ends together. Part of the cheek is thus, of course, enclosed in the loop. When an opening into the mouth is thus kept open for ten days, endeavor to close the external opening by cauterization, unless it close spontaneously. (2) Salivary fistula from abscess in a gland is difficult to cure. Try cauterization.

SALIVATION.—Increased flow of saliva is a frequent and troublesome symptom, which may be brought on by a variety of causes. In some cases the secretion is not actually formed in excess, but is allowed to flow from the mouth instead of being swallowed, so that it appears to be produced in abnormal quantity. The amount discharged varies greatly, but it may be exceedingly large, either continually running from the mouth, or causing the patient to be perpetually spitting or swallowing, or to saturate several handkerchiefs daily. The fluid is not quite identical in composition with healthy saliva, and may be mixed with various morbid materials. It contains some mucus, with numerous epithelium cells. Its reaction is alkaline, and it yields a good proportion of fat, but after a time little or no ptyalin or sulphocyanide of potassium can be detected. Albumen is sometimes present. Digestion is generally impaired and marked emaciation may be produced. Sometimes the fluid is ejected from the stomach in considerable quantity after having been swallowed.

Etiology.—1. More or less salivation accompanies the various sources of local irritation in connection with the mouth already considered, such as stomatitis or ulcers; being also produced by irritating substances taken into the mouth. These act by causing reflex excitation. 2. Reflex irritation through other nerves often induces ptyalism. Thus it may be associated with throat inflammations, many diseases of the stomach and pancreas, or worms in the intestines; while it is a symptom very commonly observed in cases of pregnancy. 3. In certain nervous diseases salivation is not uncommon, as in various forms of insanity, hydrophobia, hysteria, paralysis, and neuralgia of the face. In some of these affections it is produced in a reflex manner; in others as the result of some direction cerebral influence. 4. Certain metallic and vegetable substances, when taken for some time, induce ptyalism, by causing local iritation, and also by directly influencing the secretion of saliva. Of these the most important is mercury, but iodine and other substances have sometimes a similar action. 5. Critical salivation is observed in some cases of fever, but salivation in febrile diseases is not always connected with a crisis. 6. Infants and old people are liable to an excessive flow of saliva. In the former this is often associated with dentition. In both classes of subjects there is frequently no excess of secretion formed, but the saliva is allowed to escape from the mouth instead of being swallowed. 8. Idiopathic salivation is that form which occurs without any obvious cause.

Treatment.—1. The cause must be sought out, and if possible removed. In many cases this is all that is required. 2. Astringent mouth-washes are useful, such as solution of alum, tannic acid, oak bark, or weak mineral atcids; or alum may be sucked. 3. Opium is recommended as a valuable internal remedy in obstinate cases of ptyalism.—FREDERICK T. ROBERTS.

SARCOCELE—*See Testicle, Diseases of.*

SARCOMA
SARCOMATA } *See Tumors.*

SATURNISM.—*Etiology.*—The introduction of lead into the system is most important in connection with certain occupations in which this metal is used, saturnism being especially common among painters, plumbers, and workers in white lead. Sometimes it acts as a poison through being taken in water kept in leaden cisterns, in cider, in adulterated articles, or medicinally; or it may be inhaled in fresh paint; or now and then it gains access into the body in curious ways, as from using adulterated snuff, or rubbing the ointment into the skin. As a rule the metal is either swallowed or inhaled, and enters the system by both the alimentary canal and the lungs. It becomes in time deposited in the various organs and tissues, but especially in the muscles, nerves, and nerve-centres, impairing their nutrition, the muscles becoming the seat of marked fatty degeneration and atrophy.

Symptoms.—Certain objective appearances are usually very obvious in connection with chronic saturnism, viz., the so-called blue line on the gums at their junction with the teeth; a dirty brown or black incrustation of the latter, if they are not cleaned, with rapid tendency to decay; more or less emaciation, with a dry harsh skin, and a peculiar sallow, pale, or yellowish tint of countenance, with yellowness of the conjunctivæ. The breath is generally offensive, and a sweetish taste is frequently experienced. In some cases the pulse is very infrequent and slow. The prominent clinical phenomena which may be associated with lead-poisoning may be summed up thus: 1. Lead colic, having the characters of more or less severe intestinal colic, accompanied usually with a retracted abdomen; absolute constipation; nausea and vomiting; eructations; and hiccough. 2. Disorders of sensation, such as hyperæsthesia or hypæsthesia of different parts, numbness, formication, neuralgic pains, aching in the limbs and joints, and headache. 3. Amaurosis, either single or double, usually associated with other grave nervous symptoms, and accompanied with changes visible with the ophthalmoscope. 4. Motor disturbance, in the way of tremors, epileptiform convulsions, or local paralysis. The most common and important variety of paralysis is that of the extensors and supinators of the fore-arm, giving rise to wrist-drop; the upper limbs are, however, often affected more or less throughout, and the legs also in many cases, as well as the muscles of other parts of the body. As a rule both forearms are implicated, but not equally. The muscles are generally considerably wasted, giving rise to a depression on the back of the forearm, and those of the hands may also be much atrophied, so as to make them assume the crow-foot shape. Sometimes they are strongly closed, as if the flexor muscles were rigid. The condition of electric contractility and sensibility has been considered in a former chapter. The predisposing influence of lead in the system with reference to gout has been alluded to in connection with that disease.

Treatment.—Preventive measures are most important in the case of those working with lead. They should be very particular as to cleanliness, especially in washing their hands and cleaning their nails before eating, and in cleansing their lips and teeth. Every precaution should be taken against inhaling particles of lead. I believe a good deal of the metal is often introduced during meals, and the practice of taking a small quantity of dilute sulphuric acid in water at these times may be useful, as this would form an insoluble compound with any lead entering the stomach. The bowels must always be kept well opened. If there is any lead in the system, iodide of potassium may be given from time to time. Lead colic must be treated in the same way as other forms of intestinal colic. The great remedy for getting the metal out of the system, which is the main object to be aimed at in all cases, is iodide of potassium, a soluble iodide of lead being formed, which passes away in the urine and other excretions. It must be given for a long time. Sulphur baths are also said to be useful. Paralysis, neuralgic pains, and other nervous symptoms must be treated according to the principles previously laid down.—FREDERICK T. ROBERTS.

SCABIES.—*Definition.*—A contagious disease of the skin, produced by the presence of the acarus scabiei in the epidermis.

Symptoms.—Following the arrangement of Hebra, we may class the phenomena of scabies under three headings, viz.:

1. Those arising directly from the presence of acari in the skin.
2. Those which are the result of scratching.
3. Those which are produced by the action of other irritants upon portions of skin affected by acari.

1. Those directly due to the pressure of acari in the skin. The full-grown female acarus after impregnation begins at once to work her way into the epidermis, and burrows somewhat obliquely under the surface into the soft cells of the stratum lucidum or the rete, giving rise to a narrow, somewhat sinuous tunnel or cuniculus. The tunnel, whitish, and dotted here and there with darkish spots,—six or eight in number, which are the deposited ova,—is somewhat dilated at its terminal extremity into a small roundish chamber, in which the acarus lies. At times the burrow is seen as a whitish line on the summit of a reddish ridge, and occasionally vesicles or pustules form near to or along the course of the cuniculus, but never involve its germinal chamber. At the extremities the burrows, which *average* $\frac{1}{8}$*th of* an inch in length, but which may vary from $\frac{1}{25}$th of *an inch to two or three* inches, are usually blackened by contact with

staining materials, dirt, etc., on the trunk, penis, buttocks, elbows, and knees, and in the skin of children; while upon the hands of very cleanly people they are pale and not easily detected. In adults the disease most frequently attacks the interdigital webs and the thin skin on the flexor surface of the wrist; it also attacks the penis, hypogastrium, the buttocks, axillæ or flexures of the elbows, mammæ, and inner ankles. In children the buttocks and feet are the chief seats of the disease, but any part of the body may become inoculated. The scalp and face are never implicated in adults, and only very rarely in children. The burrowing of the acarus is accompanied by itching, which is worse at night; and by the irritation of the parasite alone, as well as by the scratching it excites, urticarial, eczematous, pustular, or ecthymatous eruptions may be produced.

2. As a result of scratching linear wheals, excoriated papules covered with black crusts of dried blood, vesicles, pustules, etc., are usually developed, forming a "pruritic rash" similar to that of pediculosis. It is always most marked on the front of the trunk and thighs, being limited to, or at all events most intense on, a space bounded by the mammary line above and the knees below. The face is very seldom scratched, and the back to a less extent than the front of the trunk.

3. If the skin affected with itch be exposed to pressure or friction, papules, tubercles, pustules, or crusts appear over the tubera ischii,—*e. g.*, when persons sit on hard benches,—or they may present themselves on the tracts of skin indurated by crutches, trusses, belts, garters, or tight clothes. These nodules may or may not exhibit burrows on their summits.

Diagnosis.—The diagnosis of scabies is based upon the history of contagion, usually to be elicited, the steady progress of the affection, the presence of itching, aggravated at night, the particular site of the eruption, on the wrists and between the fingers most frequently in adults (unless parasiticide soaps be used), on the penis, hypogastrium, and mammæ, or on the buttocks and feet, in infants, and by the discovery of cuniculi, from the terminal dilatations of which the acari can be extracted and examined microscopically.

When, as in infants, the burrows cannot be easily distinguished and crusts are abundant, the maceration of these with liquor potassæ will often assist the discovery of full-grown or embryonic acari.

Attention to these distinctive features will simplify the diagnosis of scabies, even though it should be complicated with pruritic, eczematous, or ecthymatous eruptions. Prurigo of Hebra differs from scabies by the presence of hard, solid, fleshy papules, by its history, and by the greater severity of the itching.

In pediculosis corporis, as in scabies, a "pruritic rash" may be present upon the trunk, but the absence of cuniculi in the skin will sufficiently distinguish the former from the latter.

Prognosis.—Scabies is merely a local trouble; exerts no deteriorating influence on the constitution even in inveterate cases. It usually yields to parasiticides, and the eczematous eruptions excited by it and by the scratching subside under suitable treatment.

Treatment.—Give a warm bath, wash well with soap, thoroughly rub in some parasiticide ointment, containing as the essential ingredient grs. xx to ʒ ss of sulphur to ℥ j of lard, scented with various aromatic oils; put on close-fitting flannel drawers and jerseys so as to keep the ointment acting upon the skin; and repeat the bath and the washing at the end of forty-eight hours If itching continues after this, the same plan must be adopted again. Care must be taken not to use too strong preparations of sulphur, as they are apt to produce a severe eczematous condition. As a substitute balsam of Peru, or storax in the form of an ointment, may be tried. Sulphur vapor baths have been recommended, but they are not so efficacious as the other modes of treatment.—MALCOLM MORRIS.

SCALP, Injuries of—*See Head, Injuries of.*

SCAPULA, Dislocation of—*See Dislocations.*

SCAPULA, Excision of—*See Excision of Joints.*

SCAPULA, Fracture of—*See Fractures.*

SCARLATINA—*See Scarlet Fever.*

SCARLATINA RHEUMATICA—*See Dengue.*

SCARLET FEVER.—*Definition.*—Scarlatina is an acute infectious disease characterized by the presence of a red rash on the body and extremities, and of redness and swelling of the fauces, accompanied by symptoms of constitutional disturbance.

Symptoms.—Between twenty-four hours and seven or eight days after the reception of the poison the patient is attacked by shivering, vomiting, headache, and sore throat. The soreness of the throat rapidly increases, and from twelve to thirty-six hours after the beginning of the constitutional symptoms a rash commences to appear on the chest, neck, and wrists, whence it may extend over the whole body. The rash is generally at its height about the third or fourth day of the disease, then begins to fade, and disappears in about a week or ten days. This disappearance is followed by desquamation of the cuticle, which generally begins in the latter part of the second week, but may commence as the rash fades or not until the end of the sixth week. Desquamation occurs over the whole body, particularly on the hands and feet, and is by no means limited to the site of the eruption.

During the continuance of the rash the condition of the fauces is characteristic; the whole mucous membrane is highly injected, the papillæ of the soft palate are bright red and prominent, and the whole of the parts are more or less swollen. Occasionally ulceration of the tonsils takes place, and the glands of the neck are nearly always somewhat enlarged, and sometimes suppurate. The tongue at an early stage of the fever is covered with a white fur through which the papillæ, which have become red and swollen, show themselves, particularly at the edges, thus giving the strawberry appearance well known as a symptom of the disease. Later on as the fever subsides and as the rash fades, the tongue commences to desquamate, the fur is gradually removed, leaving it of a bright-red color, with its papillæ considerably enlarged, and gradually the bright redness fades to a normal hue, the papillæ cease to be swollen, and it recovers its usual appearance.

From the first symptoms of the disease the temperature is higher than normal, and becomes still higher on each subsequent day until the third or fourth day, when a temperature of 103° to 104° is reached, the evening temperature being usually higher than the morning by about a degree. At the end of a week the temperature gradually falls, and by about the tenth or fourteenth day has again become normal. The pulse is considerably quickened, especially at night, when in adults 120 pulsations often occur in the minute. During the course of the disease the patient suffers from pain in the throat, particularly in swallowing; he has severe headache, and frequently some delirium. At the height of the fever albumen is often present in the urine, but disappears as the fever subsides; at a later stage, however, especially about the end of the third week, there is a tendency for it to reappear.

These are the symptoms of an average attack of scarlatina, but it must be borne in mind that they are liable to considerable modification—that the rash may be absent, or may appear only in a few dark patches or as a bright affloresence over the whole body, that the constitutional disturbance may be almost absent or may be of the severest character; that the condition of the throat varies with the severity of the attack from a simple injection to a condition ending in sloughing of tonsils, uvula, and cervical glands; and that the delirium may be altogether absent, or present at night only in a mild form or in the most violent type.

It is now necessary to describe more particularly the varieties of rash which are present in the different forms of scarlatina.

In an attack of average severity the rash first appears on the chest and neck as minute red points, which are slightly raised, the skin intervening between them being of the normal color. Later on they become brighter, and the redness which is at first limited to them extends over the intervening skin. If examined carefully, they can still be distinguished by the fact that they are redder than the surrounding skin. At this stage the skin is found to be rough on passing the hand over it. As the rash becomes more fully developed the identity of the red points is lost in the general hyperæmia; but this stage is not always reached, and in the milder form of scarlatina this identity is not lost until the rash commences to fade, while in some rarer forms the eruption does not become confluent during the whole course. The distance between the spots varies in different parts of the body. On the chest, neck, and face they are so close as usually to become confluent, while on the wrists, backs of the hands, and dorsum of the feet they are farther apart, and more frequently remain separate than when situated on the chest and neck, In some cases the intense hyperæmia of the red spots cause minute vesicles to be formed at these points. These vesicles last but twenty-four or forty-eight hours, and when they dry up the skin desquamates freely.

In the most severe forms of scarlatina an entirely different eruption is present. Instead of bright-red points appearing there is at once an escape of coloring matter from the capillaries into the superficial layers of the skin. This happens within twenty-four or thirty-six hours from the first symptom. A purple mottled appearance is thus produced, which but partially fades on pressure. There is slight general hyperæmia of the skin, but the rash is of a dusky red, which betokens an unfavorable termination. Accompanying this form in children there is the most intense restlessness and partial unconsciousness, while in adults complete consciousness sometimes remains, but there is constant vomiting of brown liquid from the stomach, a feeble, rapid, and compressible pulse, and a sense of extreme prostration. Between this and the milder forms of scarlatina there is every gradation, but it may be accepted generally that the tendency to hæmorrhage and the dusky color of the rash is an indication of a severe form of the disease. In the most severe forms the tongue is spongy; later it becomes dry, glazed, and red, and finally cracks and bleeds.

The temperature in the hæmorrhagic form is not always specially high, often not reaching above 103°; but its chief characteristic is irregularity, a considerable fall often preceding the fatal termination, while in the death agony it rises, and even after death continues to rise.

Occasionally later in the disease, even as long as a month after the first symptom, the patient again suffers from sore throat, the fauces again become swollen and injected, albumen appears in the urine, and a rash once more is developed on the chest. This varies much in appearance, but usually begins as a number of minute red points, which are soon lost in a general hyperæmia. The rash lasts sometimes but twelve hours, sometimes two or three days, and is, in all probability, due to some septic condition.

During desquamation an occasional simple injection occurs on the chest, without the presence of any constitutional symptoms. It is not uncommon, also, during convalescence, to find the legs covered with a mottled rash, which does not fade on pressure, due to the escape of blood coloring matter into the surrounding tissue. This lasts but a few days, and is also not attended by any constitutional symptoms.

Finally, it must be remembered that in all these rashes there is no tendency to œdema of the skin, except occasionally slight fullness or puffiness about the eyes, and that, with the exception of those specially mentioned, all fade on pressure.

Diagnosis.—Care is often required in the diagnosis of scarlatina, although in an attack of moderate severity its symptoms are sufficiently well marked to make its separation from other diseases a simple matter. It will not be necessary to refer to all the symptoms already described, but it will be sufficient to point out that at any period of the rash the disease may be recnized not only by the character of the eruption, but by the sore throat, the injected fauces the strawberry character of the tongue, the pyrexia, and the constitutional symptoms.

In the most severe form, when no rash is present, the diagnosis of scarlatina is almost an impossibility. Vomiting and high temperature, succeeded by restlessness, delirium and coma, are symptoms which are rather suggestive of poisoning than of a specific fever; but, as a rule, cases such as these do not occur singly, and other cases of less severity occurring immediately afterwards in members of the same family often throw light upon the first case.

In the hæmorrhagic forms the same difficulty also exists, but to a less degree, for in them the condition of the throat is often sufficient to aid the diagnosis.

From the hæmorrhagic form of variola,—the disease for which it is likely to be mistaken during small-pox epidemics,—it may be distinguished, first, by the implication of the throat; secondly, by the absence of pain in the back in scarlatina, an almost constant symptom of variola; and thirdly, by the absence of the abortive papules and vesicles which can usually be found among the hæmorrhages in the latter.

From roseola it may be distinguished, first, by the smaller size of the red points in the rash of scarlatina, and by the fact that in scarlatina the skin intervening between these points soon becomes injected. The condition of the throat and tongue, as well as the presence of pyrexia, makes the diagnosis between the erythemata and scarlatina a simple matter. Between a very mild form of scarlatina, in which the space intervening between the red spots does not become injected, in which the temperature is but slightly raised and the throat but little affected, and roseola there is often much difficulty in diagnosis; but it must be noted that in scarlatina a larger extent of the soft palate and fauces are injected than in roseola, and that the enlargement of the papillæ of the tongue covers a larger surface than in the latter disease; moreover, the papules of roseola are more raised than the red points of scarlatina.

The accompanying table (p. 770) shows the distinctive symptoms of scarlatina, measles, and rötheln.

Prognosis.—The termination of a case of scarlatina can, as a rule, be correctly predicted after the rash has existed for twenty-four hours. Until this time a guarded opinion should always be given. When the rash is fully developed and of a bright red color; when the throat affection is characterized more by injection than by swelling of tonsils and enlargement of cervical glands; when the pulse is not increased in adults to above 120 at night, recovery may be expected. When, however, the rash is badly developed and of a dark color or hæmorrhagic, the pulse very rapid, and

a tendency for the temperature to be very irregular, the mortality is very high.

	Scarlatina.	Measles.	Rotheln.
Rash.	Consists of minute red points close together on a bright-red hyperæmic ground.	Consists of papules of larger size arranged somewhat in crescentic manner on a white ground of normal skin.	Consists of slightly raised patches, varying in size, but usually about the size of a pea The skin intervening between the spots is normal in color or very slightly reddened, but later on the patches occasionally become confluent.
	First appears on chest, neck and face.	First appears on forehead and face, and extends downwards.	First appears on chest.
	Appears after about twenty-four hours' illness.	Appears after about seventy-two hours' illness.	Appears first, or is preceded for a few hours by slight catarrh.
	Attended by marked injection of fauces, increase of temperature, strawberry tongue, slight suffusion of eyes.	Only slight sore throat and but little injection, high temperature, furred tongue, papillæ sometimes enlarged, but to a less extent than in scarlatina.	Fauces injected, but less so than in scarlatina. Temperature slightly increased. Tongue furred.
		Marked coryza.	
	Followed by desquamation of skin in large flakes.	Occasionally by desquamation of skin in very small scales.	No desquamation, or only in the shape of small scales.
	Glands of throat enlarged.	Glands, as a rule, not enlarged.	Glands enlarged at different portions of body, and especially at back of the sterno-mastoid muscle.

In giving an opinion on the probable termination of a case of scarlatina, it should be borne in mind that the mortality is inversely proportionate to the age of the patient, children of two or three years of age dying in much larger proportion than those older. It may also be noted that rickety children, as a rule, have much more severe attacks than others, and that they are more liable to suffer from severe throat affection and suppuration of glands.

Treatment.—Inasmuch as scarlatina is an acute disease running a rapid course, the treatment consists in putting the patient under circumstances most favorable to his recovery. Thus a well-ventilated room of moderate temperature, the careful regulation of diet—which should consist simply of milk, beef-tea, etc., during the pyrexial period—attention to the bowels, and, if necessary, in severe cases, when the strength is failing, the administration of stimulants, are as a rule sufficient. Delirium and sleeplessness, when present, are best treated with chloral hydrate and bromide of potassium. The frequent sponging of the body with water, vinegar, etc., is extremely useful. Severe pyrexia should be treated with cold baths. The patient should remain in bed for three weeks from the beginning of the disease, with a view to preventing kidney complication. Albumen, after two or three weeks' illness, should be constantly looked for, and the treatment regulated accordingly.—MALCOLM MORRIS.

SCIATICA.—Neuralgia of great or of lesser sciatic nerve.

Causes.—(1) Catching cold, (2) pressure of hardened fæces in rectum or of pelvic tumors, (3) peripheral irritations, *e. g.*, inflamed corns, (4) many cases are of quite obscure origin. Always bear in mind that sciatic neuralgia may be only a sign of some more serious disorder.

Diagnose from hip and from sacro-iliac disease.

Treatment.—*Vide* Neuralgia. In obstinate cases try cautery, Corrigan's button, or even "nerve stretching." Purgatives, quinine. Iodide of potassium. Morphia injections. Blisters. Electricity.

For *Pathology*, &c., of Sciatica, *vide* Neuralgia.

SCIRRHUS—*See Cancer.*

SCLEREMA NEONATORUM.—*Definition.*—An acute œdema and induration of the skin, occurring in young children.

Symptoms.—The cause of this disease is not well understood, but it is believed to be due to some alteration in the condition of the capillaries, resulting from some previously existing disease, such as affections of the intestines, lung, or brain, or some congenital defect. It may also result from impaired nutrition or syphilis.

It commences with swelling of the lower extremities, following œdema and induration of the skin of the part, which is itself tense, shining, pits on pressure, and of a red, white, or livid color. After a time, varying from a few hours to two or three days, the swelling subsides, leaving the skin wrinkled; sometimes, however, the advanced stage of wrinkling of the skin is the first symptom, and is not preceded by the earlier stage of œdema. The general condition of the child is much altered, and it shows but few signs of vitality, while the temperature is lowered by two or three degrees. The disease gradually spreads upwards till the skin of the face is affected, when the features become immovable and neither the eyes nor mouth can be opened. The reduction of temperature and the loss of vitality continue till death results after from two to ten days' illness.

Diagnosis.—This disease resembles no other. A local œdema cannot be mistaken for it for more than a few hours, and the general condition then suffices to distinguish between the two.

Prognosis.—It is usually fatal.

Treatment.—This consists in first removing the primary cause, when it can be ascertained, and afterwards in restoring, when possible, the circulation through the capillaries of the affected part.—MALCOLM MORRIS.

SCLERIASIS—*See Scleroderma.*

SCLERODERMA.—*Definition.*—A rare disease of the skin, in which diffuse infiltrated and rigid areæ are met with over comparatively large portions of the surface of the body.

Symptoms.—Scleroderma begins most frequently on the back of the neck or upper extremities as a slightly raised brownish-red or pale waxy-colored patch, and may spread more or less rapidly over the face, arm, or even over the whole body, or it may take the form of ribbonlike streaks or patches scattered over the body and limbs. As in morphœa, the skin is thickened, inelastic, and adherent to the deeper tissues, so that it cannot be pinched up, and feels both cooler and dryer than the normal skin. Irregular spots of pigment are sometimes met with on or round the patches. Sensibility is sometimes slightly impaired, and temperature of the part is diminished 1° or 2° Fahr. The epidermis is normal, but may desquamate, and vesicles or other eruptions can appear upon it as on healthy skin.

The secretions of the sweat and sebaceous glands are usually, but not invariably, diminished.

When scleroderma is first developed there is a slight localized raised swelling, produced by œdema in the subcutaneous tissue, pitting on pressure, and gradually becoming sclerosed. But as the disease progresses the patches become level with or slightly depressed below the surface of the adjacent skin, and in the variety characterized by the presence of long bands the healthy skin rises on each side of them. The indurated patches subsequently, like those of morphœa, either undergo complete resolution or sclerosis and atrophy. The mucous membrane of the mouth, the tongue, and the pharynx sometimes present similar hard white patches, Patches of morphœa may precede or accompany the development of scleroderma, and the edge of the sclerodermatous patch not unfrequently presents an appearance identical with morphœa. The differences in form and color are comparatively unimportant in view of the resemblances in the rigid infiltrated condition of the skin, the similarity, if not identity, of the anatomical changes, the chronic course ending in atrophy or resolution of the affected portions of skin, and the retention of the cutaneous sensibility observed in both affections. Hence morphœa and scleroderma, if not merely stages of the same disease, are certainly due to variations in the intensity and exact localization of the same morbid process, and bear the same relation to one another as lupus erythematosus does to lupus vulgaris. In morphœa the unsymmetrical character of the patches, their abrupt limitation by the middle line, their arrangement along the course of cutaneous nerves, as in zoster, in lines or clusters, the occasional check to the development of the bones of a limb, and the slow course, unaffected by treatment, are points which strongly support the theory advocated by Mr. Hutchinson, that like zoster, the primary cause of the disease is an affection of the nervous system.

When scleroderma attacks the face, the countenance becomes fixed, the normal folds of the skin disappear, the lips and eyelids are rigid and sometimes everted, and the movements of the jaws and neck are interfered with, owing to the want of elasticity of the skin.

In the extremities the firm, tendinous bands stiffen the joints, which then become semiflexed and almost immovable, and sometimes deep-seated pains are felt in the fasciæ and bones. When atrophy of the skin has set in the subcutaneous tissue and muscles waste away, the thin, shrivelled, smooth, and reddish band of pigmented cutis appears to be in direct contact with the bones, and the wasted limb has a dried-up, skeleton-like appearance, which is persistent.

Diagnosis.—Morphœa differs from scleroderma in the form of its patches, which are round or oval and usually small, instead of being ribbonlike and covering a large area, and in their color, which is violet or lilac colored at its sharply defined margin, surrounded usually by a deep pigmented ring, and yellowish in its central portion as compared with the pale white of scleroderma.

Prognosis.—Like morphœa, scleroderma never causes death, though helplessness and great deformity may result from it. The patches occasionally undergo spontaneous resolution, and the skin resumes its normal character.

Treatment.—No specific internal remedy or local treatment has any effect on the disease, but nutritious diet, good hygiene, and tonics are recommended—Malcolm Morris.

SCORBUTUS—*See Scurvy.*

SCROFULA.—*Definition.*—A diathesis rather than a disease. Its characteristics are neatly given by Billroth as follows: " Exists chiefly during childhood; though more advanced ages are not free from it."* "Persons with this diathesis, especially children, are greatly disposed to chronic inflammatory swellings of the lymphatic glands, even after inconsiderable irritations, to certain inflammations of the skin (eczema, impetigo), especially of the face and head, to catarrhal inflammations of the mucous membranes, especially of the conjunctiva, more rarely of the intestinal canal and respiratory organs, to chronic inflammation of the periosteum, and of the synovial membranes of the joints." Formerly the condition called "tuberculosis" was unanimously included in the term scrofula. Majority of modern pathologists differentiate the two, while acknowledging the frequent origin of the former from the products of ehronic inflammations induced by the latter. *Causes.*—Inheritance. Unfavorable conditions of life (?) *e. g.*, low, damp dwelling, want of light, insufficient food, mental depression. Attacks of acute, infectious fever, especially measles. *Pathology and Symptoms.*—See under head of Glands, Chronic Disease of; Ulcers, Scrofulous; Joints, Chronic Disease of; Ophthalmia, Strumous, &c. Chronic inflammations, the result of scrofula, are indolent and slow to disperse. They tend greatly to suppuration and caseous degeneration. Certain general appearances of the person are described as scrofulous types, especially two, viz.: (1) thick lips, muddy skin, coarse features, pot belly, flabby muscles, often with tendency to fatness; (2) fair, thin, clear skin, long eyelashes, fine hair, pearly teeth, bright, refined, "delicate" look. These so-called typical appearances are of very doubtful diagnostic value. Dyspepsia very common. *Diagnosis.*—The great question is, "What justifies the surgeon in terming a certain patient 'scrofulous?'" The answer usually depends greatly on the surgeon's individuality. By some authorities such a thing as scrofula is hardly admitted to exist, all the appearances associated with its name being referred to local or special causes. Usually any such morbid manifestations as have been catalogued above, if the known exciting cause is trivial, or if no cause at all be known, are regarded as scrofulous; and especially if more than one such affection attack the same individual, and if he present the peculiarities of personal appearances mentioned above. *Prognosis.*—Under treatment, with moderately favorable conditions, the individual manifestations usually disappear, often leaving ugly scars. But the diathesis almost always remains. It may lie latent throughout a vigorous manhood, and reappear in a decrepit old age. Danger of tuberculosis supervening; said to be greatest in fair, delicate, or "sanguine" type of the scrofulous. *Treatment.*—Hygienic and medical, general and local. Hygienic requires the various conditions usually considered "strengthening," fresh air, good food, dry lodging, daylight, cheerful occupation, flannel clothing, moderate exercise. Cleanliness of head and skin. Strict attention to each trivial ailment. Medical treatment is (1) anti-dyspeptic, and (2) tonic and nutritive. Tongue, stomach and bowels must be attended to on general principles. Gregory's powder and hydr. c. cret. often useful, especially in children. Sodæ bicarb. (grs. x–xv) ter die in inf. calumbæ just before meals. Cod-liver oil is the remedy. Give it after meals, ʒ j bis die, increased gradually up to ℥ j ter die. Occasionally suspend its administration, if it disagree with the stomach. Small doses of nitric acid and strychnine useful adjuncts. (Williams, quoted by Savory.) Iron, ammonio-tartrate, citrate, fresh carbonate, vinum ferri (iodide of iron in fat, flabby children). Iodides sometimes mischievous if fever be present. Mineral acids. Quinine, tinct. cinchonæ co. Pancreatic emulsion. Change to a new climate, which, whether warm or temperate, should certainly be dry: English watering-places, Margate, &c. Madeira, sea voyage. Local treatment is given under special heads. In old age, "**iron, cod-liver oil, sea air, &c., of little potency. Rest, warmth and good food more important" (Paget).—C. B. KEETLEY.**

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* Read Paget on "Senile Scrofula," in his Clinical Lectures.

SCROFULIDE—*See Lupus.*

SCROFULODERMA.—This disease must be carefully distinguished from lupus, though there may be some difficulty when the latter occurs in a scrofulous subject. It commences as indolent, painless, livid tubercles that very slowly soften up and give place to foul, ragged, unhealthy ulcers with pallid granulations, free secretion, and often much crusting. Occasionally the ulceration is very superficial, and creeps along the surface. This is the form which usually results from the slow breaking down of chronically inflamed and strumous glands. Marked scrofulous features will be recognized in this disease in the family history, the physiognomy, the chronic glandular inflammation, the strumous affection of the eyes or ears, and possible coincident disease of the spine or joints.

Treatment.—Internally : This consists in endeavoring to counteract the strumous habit by giving cod-liver oil or some equivalent, the iodide or phosphate of iron, quinine, or the sulphide or chloride of calcium, and good food in variety. Locally : The sores must be cleansed by such applications as iodoform or the iodide of starch paste, and the pus production may require checking by a mild mercurial ointment. Later, the sore may require a more stimulating ointment or plaster, of which the mercurial preparations are the more suitable.—"*Epitome of Skin Diseases*"—Fox.

SCROTUM, Diseases of.—The scrotum, consisting, as it does, chiefly of skin and cellular tissue, is liable to the ordinary cutaneous diseases. Moreover, inside its serous lining are found hydroceles, hæmatoceles, hernias, and diseases of the testicle. Certain affections of the scrotum present special features worthy of note. The chief of these are (1) inflammation, (2) elephantiasis, (3) epithelioma.

SCROTUM, INFLAMMATION OF, is remarkable for the amount of œdema which accompanies it, for its usually diffuse character (a kind of erysipelas), and for its frequently ending in partial sloughings. Its usual causes are extravasation of urine, or continued irritation of some trivial local affection. *Prognosis* in every way good, except in bad cases of extravasation. *Treatment*—Vide Erysipelas, and Urine, Extravasation of.

SCROTUM, ELEPHANTIASIS OF.—A cellulo-cutaneous hypertrophy, with more or less oily infiltration. Very rare except in the East and West Indies, in Egypt, and in South America. Prime cause unknown. Exciting cause, occasionally some local irritation. The tumor may even attain a weight equal to that of all the rest of the patient, trunk and limbs inclusive. Surface sometimes smooth, sometimes tuberculated. *Prognosis.*—Steady growth. Perhaps eventually death from supervening ulceration *Treatment.*—Excision. If under three stones in weight, try to dissect out and save testicles and penis. Danger of great hæmorrhage.

SCROTUM, EPITHELIOMA OF (CHIMNEY-SWEEP'S CANCER). — Chiefly attacks chimney-sweeps. Commences as a wart or tubercle "oftenest near the lower and fore part" of scrotum. (Humphrey.) Structure that of epithelioma elsewhere. *Treatment.*—Excise. Decidedly enlarged glands in groin should be excised too. Very little tendency to affect the system but great tendency to recurrence. Irritation of soot has been known to produce epithelioma on hand of a gardener.—C. B. KEETLEY.

SCURVY.—*Definition.*.—Scurvy is a general disease of the body, characterized by progressive anæmia, severe mental prostration and asthenia, impairment of nutrition and a tendency to the occurrence of hæmorrhages from mucous membranes and into the skin, muscles, and viscera. It is due to privation from, or an insufficient supply of, fresh vegetable food.

Symptoms.—The patient presents at first a dirty, pallid, or earthy-looking complexion, accompanied by languor and malaise, mental apathy and depression, and rheumatic pains in the back and the muscles of the limbs. The gums swell, forming deep-red spongy masses round the teeth, which are prone to bleed and ulcerate, giving great fetor to the breath. The teeth may loosen and drop out. Petechiæ appear at first on the lower limbs, followed by ecchymoses and subcutaneous extravasations, which spontaneously, or on slight irritation or injury, are liable to suppurate and give rise to unhealthy, painful, bleeding ulcers. Progressive anæmia, sudden syncope on slight exertion, sanguineous effusions into the pleura and pericardium, gangrene of the lungs, or diarrhœa may lead to a fatal result.

Diagnosis.—From purpura.

Prognosis.—It is serious and often fatal if untreated. Death results most frequently from asthenia or sudden syncope. Cases of moderate severity almost always recover if fresh vegetables be added to the dietary.

Treatment.—The essential point in the treatment is the restoration to the diet of vegetable food in the form of fruits, green vegetables, turnips, carrots, onions, lemon, or lime juice.

The gum affection should be treated by antiseptic and astringent washes. The tendency to syncope should be averted by rest in bed, stimulants, and digitalis.—MALCOLM MORRIS.

SEBACEOUS TUMORS—*See Tumors* (*Cystic*).

SEBARRHŒA—*See Acne Sebacea.*

SEPTICÆMIA.—A disease in which the blood is poisoned by septic matter. In this respect it does not differ from pyæmia, and many if not all cases of surgical fever. Bryant even writes, 'Surgical, suppurative, or traumatic fever; septicæmia, ichoræmia, puerperal fever, and pyæmia, may all be considered as so many different names for, and manifestations of one condition, blood-poisoning." In practice, however, "surgical fever," "septicæmia," and "pyæmia" are not considered as different names for one condition, though it is difficult to define the limits of each. I have most often heard surgeons apply the term septicæmia to acute cases in which the nervous and digestive organs were the seat of prominent symptoms, while there was an absence of clear signs of secondary abscess. Compare with pyæmia.

Causes.—*Vide* Pyæmia.

Signs.—Apathetic state; rarely excitement. Tongue very dry. Speech feeble. No appetite. Either perspiration or dryness of skin. Symptoms often bear considerable resemblance to those of typhus. Urine scanty. Temperature, at first high, tends to fall as death approaches. Occasional extreme rapidity of rise.* Bed-sores form; urine and fæces are passed in bed. Finally collapse and death. The elevation of temperature is often slight, especially in weak, old people. Chronic blood-poisoning is more likely to take one of the forms of pyæmia or the form of hectic fever.

Pathology.—Condition of the blood not at all characteristic. "If we have not seen the patient during life, we shall often examine the dead body in vain for some palpable cause of death." (Billroth.) Spleen often enlarged and softened, rarely normal. Liver congested and very friable. "In the heart the blood is lumpy, half-clotted, tarry, and rarely firmly coagulated, buffy; in most cases the lungs are normal. Where the course of the affection has been very long (a fortnight or more) the disease shows itself mostly by extensive suppuration of the cellular tissue" (near the wound), "with more or less extensive gangrene of the skin." (Billroth.)

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* From 102.6 to 107 in 10 minutes in a case under Mr. Bickersteth (*B. M. J.* 1879.)

Prognosis and Treatment.—*Vide* Pyæmia.—C. B. KEETLEY.

SEPTICÆMIA, Puerperal.—*Definition.*—A disease similar to surgical fever affecting puerperal women. Highly contagious.

Causes.—Infection from without by hands of practitioner attending similar cases, as erysipelas, pyæmia, or post-mortems, or from any other septic influence; infection from within from fetid lochia, discharge from ruptured perineum; incomplete contraction of the uterus exposing the placental site to contagium.

Symptoms.—Severe rigors, distressed and pinched expression, countenance sunken and sallow, profuse perspiration, often arrest of milk and lochia, delirium. In some bad cases the patient expresses herself as feeling quite well, and has no pain nor tenderness.

Signs.—High temperature and pulse often running, tongue as first furred and moist, then dry, red at edges, brown at sides with white in middle, or white at sides, and with a brown central line; lochia, if present, fetid; purple patches on face, chest, and thighs; bowels constipated, followed by diarrhœa, tympanites, loss of appetite and sleep.

Diagnosis.—From pure puerperal fever by history of convection of poison, by offensiveness of lochia.

Prognosis.—Usually unfavorable.

Treatment.—Intrauterine injection of Condy and water, of carbolic acid and water (1 in 80) every three hours, calomel (gr. 5-8) with opium; nourishment; quinine in large doses (gr. 5-10), alcohol. Lower the temperature by the ice-cap.—HEYWOOD SMITH.

SHAKING PALSY.—Many cases which have been described as paralysis agitans were merely those of multiple sclerosis. As a distinct affection it is presumed to be a functional disorder, or at any rate no definite organic lesion has as yet been made out.

Etiology.—Paralysis agitans has been mainly attributed to violent emotion, long continued anxiety or grief, continuous or severe exertion, injury, and exhausting diseases. Special varieties of the complaint have been described as hysterical, which occurs in hysterical persons; reflex, due to some reflex irritation (worms, wounds, etc.); and toxic, resulting from the action of some poison upon the system (mercury, alcohol, tobacco, tea, or coffee). The persons affected may be of any age, but are usually under fifty.

Symptoms.—The chief symptom of paralysis agitans is tremor, either very limited or more or less extensive, and usually exhibiting little or no tendency to advance. It is independent of voluntary movements, but may be controlled by holding the affected part. Mental excitement, fatigue, and depressing influences increase the movement, which, except in extreme cases, ceases during sleep, and may present intermissions during the day. Diminution in muscular power is perceptible, but is not marked as a rule. Sensibility is not affected, and there are no head symptoms or festination. The duration is indefinite; there is no fatal tendency; and in many cases, especially if the cause can be removed, a cure may be affected.

Diagnosis.—Paralysis agitans might be mistaken for multiple cerebral or cerebro-spinal sclerosis or the chorea. Attention to the etiology and symptoms indicated above will enable the diagnosis to be made.

Prognosis.—Death is a very rare event from paralysis agitans. It may, however, prove a very difficult complaint to cure.

Treatment.—The indications in the treatment of paralysis agitans are to remove the cause; to give good diet; to avoid fatigue and mental excitement; to improve the general health and condition of the nervous system by strychnia, iron, phosphorus, arsenic, zinc, and similar remedies; to administer sedatives, such as bromide of potassium, opium, conium, or cannabis indica; and to apply the constant current along the affected muscles and over the spine. Baths and friction may also be of service.—FREDERICK T. ROBERTS.

SHINGLES—*See Zoster.*

SHOCK.—*Causes.*—Injuries, especially if very painful, or attended with hæmorrhage; or if in certain localities, *e. g.*, abdominal viscera, testicles, and the larger joints. Mental emotion. When an injury is foreseen and expected, shock is more severe than when the recipient is excited and careless. Children less liable than adults. But acute pain readily causes collapse in a few hours in children (H. Marsh).

Signs.—Pallor, coldness, weakness, even amounting to utter prostration. Consciousness may or may not be seriously affected. The mind may be clear, and yet the limbs but little sensitive to pain. Temperature actually sinks 2°, 3°, or 4°, or more in severe cases. Pulse thread-like. Respiration, sighing. Nausea, vomiting. In certain cases the patient is noisy and delirious. Generally he is either quiet, or wanders slightly in his mind.

Course.—Death may result amost instantaneously, even when the prime injury is apparently trifling. This is most common in injuries to the abdominal viscera. But reaction usually occurs in a few hours, and is frequently excessive, passing into fever. And, again, shock may endure for many hours, and at last prove fatal.

Pathology.—It is certain that paralysis of the vaso-motor nerves, probably inhibitory, is an essential part of shock; but is not so certain whether it is universal or local. Golz showed that when a frog is struck on the abdomen, its heart ceases to beat, and at the same time the portal system is vastly distended with blood. He supposes the former phenomenon to be the effect of the latter, and the two together to account for the features of shock; but Moullin argues, and with reason, that, in shock, there is primarily a far more general inhibition of the vaso-motor system.

Diagnosis from syncope, the result of hæmorrhage.—When the hæmorrhage is internal, this diagnosis may be impossible at first; but in the case of hæmorrhage, when reaction takes place, the pallor of the gums and conjunctivæ persists.

Prognosis depends on the amount, on the persistence, and on the attendant complications of the attack. A particularly dangerous condition is that termed "prostration with excitement," in which "the languor or stupor of collapse is succeeded by restlessness, jactitation, tremor, and twitchings of the muscles, præcordial anxiety, often but not always delirium of various degrees" (Savory).

Treatment.—Warmth, hot water bottle to feet, flanks, and epigastrium, warm affusion to head. Horizontal position, Frictions. Stimulants: brandy, ammonia. Do not pour fluids down a patient unable to swallow. Galvanism to præcordia. Treat hæmorrhage if present. Remember that collapse in some cases of internal hæmorrhage is useful by giving time for nature to close the bleeding vessels. In such cases the treatment had better be limited to horizontal posture, strict quiet, external warmth, and such action as the bleeding may demand. Transfusion. When reaction has commenced, food must be given, *e. g.*, small quantities, frequently repeated, of brandy and egg mixture, milk, and strong soup. With regard to operating during stock, the surgeon seldom hesitates now, relying upon the stimulating powers of ether, and the relief from pain and discomfort which follows the removal of a mangled limb. But every care must be taken to prevent hæmorrhage, which is very badly borne by a collapsed patient.—C. B. KEETLEY.

SHORT SIGHT—*See Refraction.*

SHOULDER, Dislocation of—*See Dislocations.*

SHOULDER, Excision of—*See Excision of Joints.*

SINUS.—An abnormal passage whose length decidedly exceeds its diameter, and which is not a healthy, healing wound. Paget, in describing sinus and fistula together, says they include three classes, viz.: (1) long, narrow, suppurating canals, (2) canals giving exit to unnatural secretions (*e. g* gastric fistula, biliary fistula), (3) abnormal apertures between mucous cavities (*e. g.* vesico-vaginal fistula). He goes on to say that "if a distinction is to be made between the terms,' "sinus" should be applied exclusively to those of the first form, in which the canal has but one opening. To thus limit the term, "sinus," would be to differ from many surgeons. *Vide e. g.*, Pott's chirurgical works, p. 590. Where sinus means either blind or complete fistula.

Causes.—Usually (1) abscess; sometimes (2) wound, (3) ulceration, (4) sloughing. In addition to these, one or other of the following secondary causes almost essential, viz.—(1) Presence of dead bone, or of foreign body, (2) some mechanical obstruction to the free discharge of pus, (3) the occasional passage of secretions into the sinus, (4) presence of diseased glands strumous or otherwise. Passage of sinus among muscles is a cause which may be classed with (2).

Treatment.—Find out and treat cause. Sayre's vertebrated probe useful when track is sinuous. Remove dead bone, etc. Slit up, if situation of sinus permits. Injections of iodine, tannic acid, Condy, etc. Antiseptic bougies. Pressure. Drainage by passing a tube nearly to the bottom of the sinus. This can be combined with injection. Withdraw slightly each day. Cautery, especially galvanic or benzoline cautery. If the sinus pass among muscles, and cannot be slit up, the attachments of these muscles should be fixed by bandages, etc.—C. B. KEETLEY.

SKIN, Anæmia of—*See Anæmia of Skin.*

SKIN, Atrophy of—*See Atrophia Cutis.*

SKIN, Grafting—*See Skin, Transplantation of.*

SKIN, Hyperæmia of—*See Hyperæmia of Skin.*

SKIN, Transplantation of.—(1) Minute pieces of epidermis, which should include the youngest layers, namely, those next the true skin, are shaved or cut off, and placed upon the surface of a healing ulcer, in order that they may there form nuclei whence cicatrization may spread. (2) Skin is sometimes only partially severed from its connections, and then, with the circulation still active within it, transferred to the raw surface of another part. In this way, *e. g.*, gaps in the skin of the chest may be filled in from that of the arm. Of course the arm has to be bound to the bosom until the skin has formed adhesions in its new site. (3) Pieces of skin even of considerable size, thoroughly cleaned of subcutaneous tissue, have been successfully transplanted without any pedicle being left attached to them.—*Vide* papers by Wolff of Glasgow. In the first (far the commonest) method, it is enough to place a small piece of gutta-percha tissue over each transplanted fragment, and to cover with water-dressing.—C. B. KEETLEY.

SKOLIOSIS.—*Definition:* Lateral Curvature of the Spine, *which see.*

SKULL, Fractures of—*See Head, Injuries of.*

SLOUGHING—*See Gangrene.*

SMALL-POX.—*Definition.*—An acute infectious disease characterized by the existence of a rash, which passes through the successive stages of papules, vesicles, and pustules, accompanied by symptoms of considerable constitutional disturbance.

Symptoms.—On the fourteenth day after the reception of the poison, headache, nausea, feverishness, severe lumbar pain, and general malaise are experienced. After forty-eight hours—that is, on the third day of the disease—an eruption of red papules appears on the face, especially its upper part and on the wrists, then extends over the chest and back and the limbs generally; about two days are occupied in the gradual appearance of the rash.

The actual site of the spots is round a hair follicle or the orifice of sebaceous or sweat glands. The papules are frequently arranged in threes and fives in a crescent shape, two crescent often coming together to form a circle. A few hours after the first appearance of a red spot it gradually becomes elevated, increases in size, assumes a dark-red color, and is hard or "shotty" to the touch; on the third day of the eruption the summit of the elevation becomes vesicular, and gradually, as the whole elevation takes this character, the summit becomes depressed, till on the fourth or fifth day of the eruption an umbilicated vesicle is formed, containing clear fluid. All the vesicles are not, however, umbilicated, this condition apparently depending on their being formed round the opening of a hair follicle. The contents of the vesicles gradually become more turbid, and by about the sixth day of the eruption becomes pustular. The base of the pustule then become hard, and the whole of the skin, especially about the face, becomes œdematous. About the eighth or ninth day of the eruption the pustules, which in the meantime have largely lost their umbilication, burst, and crusts or scales form on the surface. After a variable time, of from a few days to five or six weeks, the crusts are shed, and a depressed purple stain alone remains to indicate the position of the former pustule; from this a succession of fine scales are frequently shed. The color may persist for some weeks, but gradually fades, and the depression contracts, leaving a cicatrix, the well-known "pitting" of small-pox.

If the pustules have been numerous the skin of the face rarely recovers its normal pink, transparent appearance, but remains permanently of a uniform pasty white color. During convalescenee small abscesses frequently form in the skin, chiefly on the thighs and legs.

During the whole course of the disease the constitutional symptoms are severe. The temperature is increased to about 104°, 105° Fahrenheit, the tongue is covered with thick creamy fur, severe pains in the head and limbs, and especially in the back, are constantly present, while delirium, sometimes of the most violent character, and intense itching of the skin during the whole course of the eruption, prevent sleep, which is much required. As the crusts are formed the fever decreases until the temperature becomes normal. The severity of the constitutional symptoms depends altogether on the amount of rash. It has been stated that considerable variation exists in the different forms of small-pox; these will now be described.

1. *Variola Discreta.*—The pustules remain separate from each other during the whole course of the disease.
2. *Variola Semi-confluens.*—A few pustules run together on the face.
3. *Variola Confluens.*—The pustules run together all over the body.
4. *Variola Corymbosa.*—The pustules are arranged in groups, the skin surrounding which is free from eruption. This is a rare and fatal form of the disease.
5. *Variola Hæmorrhagica.*—In this, the most severe form of variola, there is a bruised appearance.

The character of the bruises is such that it would be impossible to distinguish them from those produced by blows. But at the same time there is hæmorrhage beneath the conjunctivæ, and bleeding from nearly all the mucous membranes of the body. In this form, although there is great prostration, the mind is clear. The tongue is thickly covered with white fur, and the lumbar pain is severe. Often the attack is fatal before the appearance of the rash, but if not, the papules appear rather as small hæmorrhages into the skin with ill-defined margins.

If the vesicular stage be reached the vesicles have irregular margins, which are obscured by the hæmorrhage, and the fluid which they contain becomes black from the presence of coloring matter from the blood.

The characteristic papules of small-pox may be preceded by a petechial rash. This consists of a quantity of minute petechiæ, closely aggregated together, which do not fade on pressure; their most frequent site is the lower part of the abdomen and the inner side of the thighs, the axillæ, the upper part of the arms, and the skin over the clavicle. The whole of the surface affected presents a dark and mottled appearance.

This rash must not be confounded with the true variola hæmorrhagica; often, however, the two are combined, and in these cases dark-purple or rather blue bruises appear among the petechiæ; if there be no bruises—that is, if the rash be purely petechial and not hæmorrhagic—the petechiæ in a few days gradually fade, and are replaced by the true papules of variola, which appear while the petechiæ are still present. Sometimes the papules are preceded by a hyperæmia of the skin, which may be diffuse or in separate spots, and the disease then presents an appearance closely resembling scarlatina, which is sometimes called variola roseola. The site of this rash is not limited, as in the petechial variety, but may occur over the chest and arms. It is not uncommon to see the roseolous and petechial rashes combined in the same individual, but they more often appear separately; both usually commence on the second day of the disease.

Finally, it must be remembered that small-pox often occurs in persons who have been previously vaccinated, and that under these circumstances the course of the disease is greatly modified. The successive stages of development of the rash are more rapidly completed, the rash is far less abundant, and the constitutional symptoms are less marked.

Diagnosis.—The diagnosis of variola in the early stage is not so easy as in the latter.

The roseolous rash may be mistaken during the first forty-eight hours both for scarlatina and roseola. Other symptoms, arranged in the following table, assist even at this early period in distinguishing between these diseases.

Symptoms during First Forty-eight Hour

VARIOLA.	SCARLATINA.	ROSEOLA.
Very slight sore throat.	Severe sore throat.	Very slight sore throat; redness limited to edge of soft palate.
Tongue furred.	Tongue furred.	Tongue slightly furred.
Papillæ not enlarged.	Papillæ enlarged.	Papillæ enlarged only at edges.
Rash of short duration.	Rash may last some days.	Rash of short duration.
Severe pains in back.	No marked pains in back.	No marked pains in back.
Pryexia and constitutional symptoms.	Pyrexia and constitutional symptoms.	Pyrexia and constitutional symptoms subside with appearance of rash.

On the third day, when the papular rash is appearing, it may be mistaken for measles, but it must be remembered that the rash appears on the third day in small-pox, and on the fourth day in measles, and that in the latter the chief constitutional symptom is coryza, whereas in the former there is only slight suffusion of the eyes and the usually well-marked lumbar pain. In a few hours the characteristic feeling of shotty papules, observable in passing the hand over the rash, makes the diagnosis of small-pox more simple.

A not uncommon mistake is to confuse acne, when accompanied by a pyrexial attack, with small-pox. Simple as the diagnosis apparently is, the two diseases are occasionally confounded, and it is well, therefore, to point out that the date of the appearance of the acne and the absence of the special constitutional symptoms of small-pox must be borne in mind. The same rule will enable small-pox to be distinguished from a secondary papulo-vesicular syphilide, for which it has sometimes been mistaken.

At a later stage the vesicles of small-pox present an appearance which prevents the disease being mistaken for any but varicella. Here, however, it should be remembered that the varicella rash appears on the second day, and in a few hours becomes vesicular, while in variola the date both of the appearance and vesiculation of the rash is later. The small, round, watery appearance of the varicella vesicle, its almost invariable freedom from umbilication, its tendency to appear in successive crops, scattered not in twos and threes but irregularly, renders the diagnosis anything but difficult.

Prognosis.—This will depend largely on the character of the rash. The hæmorrhagic form is always fatal. The presence of the roseolar or petechial rash is not prognostic of anything special. The amount of rash is a most important sign, the danger depending directly on the amount. The discrete variety is not usually fatal, the mortality being about two or three per cent. among the unvaccinated. In semi-confluent small-pox the mortality is about twice that of the discrete.

In variola confluens among the unvaccinated about half die. In the pustular hæmorrhagic form, where there is darkening of the vesicles, or if the vesicles be badly developed, the mortality is even higher. Age is also an important element, the mortality being much greater among the very young and old than among persons of middle age.

Treatment.—This consists in putting the patient upon a suitable diet, placing him in a well-ventilated room, attending to his bowels, seeing that he gets sufficient sleep, and, when necessary, administering stimulants. With a view to prevent pitting, many applications and methods have been used; solution of nitrate of silver, carbolic acid solutions, painting with collodion, powdering with fuller's earth, pricking and emptying the vesicles, have all in turn been resorted to without any favorable result.

The application of oil to the surface is, however, useful in allaying the intense itching which accompanies the rash, and care should be taken to prevent the patient wounding the vesicles by scratching.

When the scabs form, if they be large, they will often retain pus; they should then be softened with a poultice and removed. Abscesses should be opened early.—MALCOLM MORRIS.

SNAKE-BITES—*See Poison Wounds by Snakes, etc.*

SPAMMENORRHŒA.—*Definition.*—Scanty menstruation.

Causes.—Phthisis, ovaritis, ovarian tumor, ante-flexion, mental depression.

Treatment.—According to the cases (*vide in loco*). In functional cases stimulants to the uterus, leeches, pulsatilla, ice-bag, to sacrum, warm enemata, good diet, exercise, change of air, iron, quinine, strychnia.

SPASMS—*See Convulsions.*

SPERMATORRHŒA.—An abnormal discharge of semen. A chronic disorder. Nocturnal emissions, if not oftener than once a fortnight, scarcely considered abnormal.

Cause.—Almost always masturbation.

Symptoms—Niemeyer describes four classes of cases: (1) Persons who have unnatural emissons simply because they continue to masturbate. To their doctor they describe such symptoms as "nervousness," lassitude, palpitation, various exaggerated pains about the genitalia, etc. They readily confess that they have practised self-abuse, but pretend they have *given it up.* (2) Robust looking persons who have really given up their bad habits and recovered their general health, but who are sexual hypochondriacs for some other reason. (3) Weakly, anæmic persons, who have never masturbated, and in whom ordinary and not frequent wet dreams produce dullness and lassitude. (4) True cases of spermatorrhœa, in which exhaustion, etc., are really produced by too frequent seminal losses. Their symptoms are as follow: sadness, dislike to work, lassitude, inattention, cowardice, tremblings, noises in the head, dizziness, neuralgic pain in back of head, etc. Resemblance to hysteria. In these cases especially, semen often flows away with the urine or during defæcation. But note, the latter symptom is not uncommon in healthy men. Distinguish between mere mucus and semen by the microscope, which in the latter case should discover spermatozoa.

Pathology of the last form (true spermatorrhœa).—Probably a state of chronic congestion and relaxation about the prostatic part of the urethra and the openings of the seminal ducts, added to an undue irritability ot the nervous system; in fact, a condition similar to the hysteria caused in women by ulceration of the os uteri.

Prognosis.—Cure difficult in many cases, (1) because patient will not refrain from bad habits, either of self-abuse, of alcohol drinking, of excessive meat eating, of lying in bed in the morning or of sedentary employment without proper outdoor exercise; (2) because of chronic nature of ailment.

Treatment.—Insist upon total abstinence from the vices just enumerated. The difficulty of stopping masturbation is well known. It seems to me that the most rational indication is to be derived from its being essentially a secret vice, practised chiefly or entirely in bed. A patient who eventually lost his reason through it, even when the habit was inveterate, always ceased from it so long as his attendant slept in the same bed with him. The sex of the bed-fellow does not affect the result, therefore marriage may be advisable. Occasional intercourse with lewd women, which has been recommended even by physicians, is of somewhat doubtful value, and of course morally objectionable. Cold hip-baths in the morning. Patient should get up and empty his bladder as soon as ever he awakes in the morning, even if he gets into bed again. Hard mattress. No suppers; no tea in evening. Attend to digestion. Revelenta Arabica, or fish and milk diet may be useful. Keep bowels open. Blisters to perineum. When varicocele or relaxed genitalia co-exist, patient should wear my suspensory bandage, made by Arnold, of West Smithfield. If improvement be not satisfactory, cauterize prostatic part of urethra with Lallemand's "porte-caustique." Repeat three or four times if necessary. Drugs given are (1) belladonna, gr. ¼ of extract + zinci sulph. gr. iiss. ter die; (2) bromide of potassium. Phosphorus, quinia, strychnia, iron and cantharides are given when spermatorrhœa is associated with impotence.—C. B. KEETLEY.

SPINA BIFIDA—*See Spine, Diseases of.*

SPINAL ANÆMIA.—*Definition.*—A deficient quantity of blood in the spinal cord, or a depravation in the quality of the blood circulating through its tissue.

Two Varieties.—Anæmia of the posterior columns known as spinal irritation and anæmia of the anterior columns characterized by paralysis, such as reflex paralysis, inhibitory paralysis, spinal paresis, paralysis from peripheral irritation, etc.

First Variety—Spinal Irritation—Causes.—Predisposing causes are sex, age, and hereditary influences, most frequent in females between fifteen and twenty-five. Exciting causes are blows, falls or strains, sexual excesses, onanism, anxiety, grief, excessive mental exertion, insufficient physical exercise, innutritious and innufficient food, abuse of alcoholic liquors and opium, exhausting diseases, obliteration of the aorta or spinal vessels by tumors, thrombosis, or embolism, by hæmorrhage from vessels in relation with those of the cord, or by exposure to severe cold, in general terms any cause capable of reducing the powers of the system may cause spinal irritation.

Symptoms.—Are both centric an eccentric. The centric symptoms are tenderness at some one or more points over the spinal column, increased by pressure, generally in the dorsal region and very variable in degree; and pain in the spinal cord developed by percussion and which may or may not correspond with seat of tenderness.

The eccentric symptoms vary with the region of the cord affected; if the cervical region, they are vertigo, headache, noises in the ears, disturbances of vision, fullness and a sense of constriction across the forehead, mental aberration, melancholia, insomnia, neuralgic pains, fibrillary twitchings, clonic spasms, general chorea, possibly aphonia, hiccough and loss of power over the hand, and nausea; if the dorsal region is the part affected there may be gastralgia, nausea and vomiting, pyrosis, gastric flatulence, acidity, palpitations of the heart, fits of oppression, attacks of syncope, difficulty of breathing, cough, intercostal neuralgia, inframammary pains, possibly epilepsy and chorea paralytica; if the lumbar region is the seat of tenderness the symptoms are neuralgic pains in the lower extremities, spasm of the neck of the bladder, incontinence of urine, pain in the uterus and ovaries, neuralgia of the rectum, tonic contractions of the muscles of the lower extremities, occasional clonic spasms, simulating chorea, possibly paralysis; if the whole spine is affected the most prominent symtoms are epilepsy, paralysis, contractions of the limbs, neuralgic uains, difficulty of swallowing and aphonia.

Prognosis.—Favorable. It is very amenable to treatment.

Treatment.—The principles of treatment applicable to spinal irritation are, 1. To remove the cause; 2. to improve the general tone of the system; 3. to increase the amount of blood in the spinal cord and improve the nutrition of this organ; 4. to set up a counter-irritant action in the vicinity of the disordered region of the cord.

Having removed the cause, the second indication is to be met by tonics, as quinine and iron and stimulants judiciously administered, preferably, whiskey, brandy or rum; oxide of zinc and cod liver oil may also be of service. The third indication is fulfilled by strychnia, phosphorus, phosphoric acid and opium. A pill containing ext. nux vom., gr. ½, zinc phosphide, gr. $\frac{1}{10}$, may be given three times. Strychnia may given in doses of $\frac{1}{32}$ of a grain to half a drachm of dilute phosphoric acid. Opium is best given by hypodermic injection or in the form of suppositories containing gr. ½ of the aqueous extract and a sufficient quantity of butter of cacao. The application to the spine of water as hot as can be borne, by means of India rubber bags, is an admirable adjuvant. But the most efficient remedy to remove spinal irritation is the direct galvanic current, either pole being applied at some point above the seat of pain, and the other at a point an equal distance below. The current should not be passed at any one *seance* for more than fifteen minutes, and no one application should last longer than three or four minutes. For the relief of spinal tenderness one pole should be applied directly to the painful part and the other to the point distant laterally from it a few inches. The fourth indication if properly carried into effect will often result in the cure of slight cases without other treatment. Blisters should be applied to the skin immediately over the painful part of the spine and should be renewed as often as may be necessary. Dry cups applied on each side of the spinous processes for an extent of four or five inches above and below the painful spot are admissible.

The food should be highly nutritious, moderate physical exercise should be taken and as much time as possible spent in the open air. Patients should not be discouraged from lying down the greater part of the day, as by that means the blood is allowed to settle in the spinal vessels. If there is any loss of power in the lower extremities the induced or faradaic current applied to the affected muscles and the direct current passed through the neuralgic nervous trunks is almost always of service.

Second Variety—Anæmia of the Antero-Lateral Columns of the Cord—Causes.—Anything interrupting the flow of blood to this region, or so lowering its quality as to unfit it for the purposes of nutrition; abdominal tumors pressing on the aorta, or disease of this vessel leading to partial or complete obliteration; thrombosis, or embolism of the spinal arteries; direct loss of blood from vessels supplying the cord or deriving their blood from the spinal vessels; extreme cold by lessening the calibre of the intra-spinal vessels, or lying on damp ground, or various exhausting diseases, may cause anæmia of the antero-lateral columns. The most common cause, however, is undoubtedly peripheral irritation, and this is very frequently an affection of the genito-urinary organs.

Symptoms.—Incomplete paralysis of motion in those parts of the body which derive their nerves from the affected portion of the cord, and in many cases of those below the seat of the lesion. The tibialis anticus and peroneal group of muscles are more apt to be paralyzed than others. The paralysis is usually confined to the lower extremity, constituting paraplegia, and is rarely accompanied by reflex symptoms of any prominence.

Prognosis.—Favorable.

Treatment.—Is in general the same as that applicable to anæmia of the posterior columns, although there is not the same benefit to be derived from counter-irritation. The indications are to remove the cause, improve the tone of the system and increase the amount of blood in the spinal vessels.—WILLIAM A. HAMMOND.

SPINAL APOPLEXY—*See Spinal Hæmorrhage.*

SPINAL HÆMORRHAGE.—*Causes.*—Blows on the vertebral column, falls, gunshot or penetrating wounds, tetanus, rupture of aneurisms. Excessive fatigue, the suppression of the menstrual flow, undue venereal indulgence, alcoholism, yellow fever, typhoid fever, disease of the vertebræ, and the toxic influence of strychnia have also been alleged as causes.

Symptoms.—Pain at the seat of the lesion, derangements of sensibility and of the power of motion in all those parts of the body below. These consist ordinarily of anæsthesia and loss of motility, but occasionally there are hyperæsthesia and spasms. The bladder and its sphincter and the sphincter ani are paralyzed, reflex excitability and electro-muscular contractility are soon impaired or lost and obstinate priapism sometimes is present.

Prognosis.—Almost invariably fatal.

Treatment.—Maintain the patient in as quiet a condition as possible, and keep ice constantly applied to the vertebral column. If there is time ergot might be administered with advantage, and in some cases leeches to the arms may be of service. When the lesion is not due to traumatism, more may be expected of remedial measures. Ergot should be energetically administered in large doses, two or three drachms every four hours, or, what is perhaps preferable, ergotine should be given to the extent of five grains hypodermically every four hours. The other measures mentioned above should also be employed with the view of causing absorption of the effused blood; the actual cautery applied to the spine in the vicinity of the lesion has also been recommended, but should not be used till it is evident from the non-progressive character of the symptoms that the extravasation is no longer going on.—WILLIAM A. HAMMOND.

SPINAL MENINGITIS.—*Definition.*—Inflammation of the membranes of the spinal cord.

Varieties.—Acute and Chronic.

Causes.—Exposure to cold and moisture is the most frequent cause of both varieties. Other causes are wounds, and injuries, and syphilis.

Symptoms.—Pain in the spinal region and in other parts of the body; spasms and contractions of the lower extremities, and spasms of the muscles of the back. The spinal pain is not increased by pressure over the vertebræ, but is aggravated by every movement of the body. There is usually acute hyperæsthesia. The paralysis advances gradually, and is subject to great variations in degree and intensity. The bladder is sometimes paralyzed ; the sphincter may be similarly affected, or this latter may be subject to repeated attacks of spasm by which the evacuation of urine is prevented. The bowels may be either constipated or the sphincter ani may be paralyzed and allow the involuntary passage of the fæces. The symptoms are usually aggravated by the recumbent posture. Bed sores are a frequent accompaniment of chronic spinal meningitis.

Prognosis.—Unfavorable, except when due to syphilis.

Treatment.—In the acute form, active measures are required. The application of leeches to the painful part of the spine, or of cups so as to effect local depletion will generally prove useful. Hydragogue cathartics are also beneficial, for by their action the vessels of the inflamed membranes are depleted of their blood, and the excessive amount of spinal fluid effused is in consequence more readily absorbed.

Mercury, either by inunction with mercurial ointment, or by calomel internally, or by both these means, is of service. Calomel should be given in doses of from one to two grains every three or four hours, till the system is brought fully under its influence, as manifested by fetor of the breath.

The patient should be kept as quiet as possible, and enjoined not to lie on the back. For the relief of the dorsal and other pains, suppositories, containing each half a grain of codeine are often efficacious. They may be administered night and morning.

In the chronic form depletion is not so beneficial, blisters, however, are admissible, and scarcely ever fail to do good. They should be applied on each side of the spinal column near the diseased region of the cord, and as soon as one heals another should take its place. Purgatives are useful. Iodide of potassium is more useful than any other remedy. It is best employed in the form of a saturated solution which contains a grain to each drop. Of this, seven drops should be administered three times, preferably after meals on the first day ; the next day eight drops to the dose and so on till the patient takes from 40 to 60 drops at the dose, according to circumstances. As the doses are increased, an additional quantity of water should be used, as the iodide of potassium always acts best when largely diluted.

In combination with the iodide of potassium, especially in syphilitic cases, the corrosive chloride of mercury in doses of the sixteenth of a grain, three times a day may be employed.

In most cases the primary galvanic current applied to the spine in the manner recommended for spinal congestion and the induced current to the paralyzed limbs, may be employed with advantage.

For the bed-sores, alternate applications of sponges, one of which is saturated in hot, and the other in cold water, and continued for five or ten minutes every day, as recommended by Dr. Brown-Séquard, promote the formation of granulations. Or the following method will effect a cure: a thin silver plate no thicker than a sheet of paper, is cut to the exact size and shape of the bed-sore ; a zinc plate of the same size is connected with the silver plate by a fine silver or copper wire, six or eight inches in length. The silver plate is then placed in immediate contact with the bed-sore and the zinc plate on some part of the skin above, a piece of chamois skin soaked in vinegar and kept moist intervening. Within a few hours the effect of this battery is perceptible, and in a day or two the cure is complete in the majority of cases.

In the meningitis and myelitis resulting from Pott's disease, the actual cautery is of inestimable value. The number of cauterizations need not exceed five or six, and they are best made with the disc-ending iron with platinum tip, which should be applied at several points on each side of the diseased vertebræ.—WILLIAM A. HAMMOND.

SPINAL CORD, Non-inflammatory softening of the.—*Two Varieties.*—The inflammatory form, the common termination of acute myelitis which is discussed in connection with that affection and the non-inflammatory, which may originate primarily, and in that event possesses a clinical history distinct from that of acute inflammatory softening, and which we shall now consider.

Causes.—The causes are not very clearly understood. It arises as a consequence of acute myelitis, but it is often an independent and apparently a primary affection. Such influences as give rise to cerebral softening will in all probability cause spinal softening, and among them must be placed obliteration of blood-vessels from embolism and thrombosis.

Symptoms.—Numbness in those parts of the body below the seat of the lesion, succeeded by weakness and deficiency of sensation and feebleness of motor power becoming gradually more and more marked. Impairment and gradual loss of the contractile power of the bladder, which ultimately becomes completely paralyzed and allows the urine to dribble away. There may be obstinate constipation of the bowels, or the sphincter ani may be relaxed and the fecal contents evacuated as soon as they reach the rectum. As a rule, reflex excitability is weakened and gradually disappears. The venereal appetite is extinguished, and the parts below the seat of lesion are to all intents and purposes cut off from communication with those above. Such are the symptoms when the lesion is low down and involves both antero-lateral and posterior columns. When it is higher up the symptoms are also referable to the thoracic extremities, to the muscles concerned in deglutition and respiration, and there are also visceral disturbances. When the lesion is confined to the antero-lateral columns there are the symptoms of motor paralysis, when confined to the posterior columns those of sensory paralysis.

Prognosis.—Always unfavorable as regards recovery, but it is not necessarily a fatal disease, the probability of a fatal termination is less when the lesion is in the lower, dorsal, lumbar, or sacral region than when higher up.

Treatment.—After the process of softening has fairly entered upon its course nothing can be done. In the very early stages, if patients apply for treatment, something may perhaps be done by the use of phosphorus and strychnia, but the symptoms come on so insidiously that the patient rarely has his apprehension excited till it is too late to do anything to arrest the course of the disease. The patient, however, may be made comfortable to such an extent as to materially prolong his life. Care should, to this end, be taken that he does not sustain a fall or suffer an injury whereby the diffluent portion of the cord would be disturbed in its anatomical relations, and the danger of an attack of acute meningitis or of myelitis incurred. Bed-sores should be prevented, or, if they occur, treated according to the methods previously mentioned, and full instructions should be given in regard to emptying the bladder with the catheter at regular intervals, and of going to stool at the same hour every day. Locomotion may be provided for by the use of some one of the chairs provided for paraplegics. As there is little in softening of the cord situated below the origin of the phrenic nerves which is directly calculated to destroy life, there is no reason why, with the adoption of proper measures, the patient should not enjoy a measurable degree of comfort for many years. Probably the event most apt to occur is acute or chronic cystitis from paralysis of the bladder, but attention to the injunctions above given will do much towards lessening the liability of this affection.—WILLIAM A. HAMMOND.

SPINAL CORD, Tumors of the.—*Causes.*—Nothing is known of their etiology beyond the fact that they may result from the syphilitic, scrofulous and cancerous diatheses and from wounds and injuries.

Symptoms.—These are of two categories resulting as they do either from irritation or compression. Under the first head are embraced pain in the back, in the limbs, and in the viscera, if the posterior columns are mainly the seat of the lesion, or subjected to the pressure of a vertebral tumor, and twitchings of the muscles and contractions of the limbs. If the antero-lateral columns are mainly the seat of the lesion. When both sets of columns, as is generally the case, are affected, the troubles of motility and sensibility are both present. The symptoms, so far as the limbs and viscera are concerned, vary in their extent according to the situation of the morbid growth. If the tumor is situated in the cervical or upper dorsal region there is generally tonic contraction of the muscles of the neck, by which the head is thrown backward. There are in such a case usually ocular troubles and more or less gastric derangement. The symptoms of strong compression are anæsthesia and motor-paralysis, the variety of which is dependent upon the seat of the lesion, muscular atrophy ensues and the patient loses the power to stand.

Prognosis.—Always unfavorable; it is less so, however, when a syphilitic origin can be made out.

Treatment.—The attempt should always be made, whenever the existence of a tumor of the spinal cord is suspected, to effect its removal by anti-syphilitic treatment. If this treatment fail, there is nothing else left. As Leyden says, the only means of removal consists in extirpation by trephining the vertebral column. Who will be the first to attempt the operation? As a means of mitigating the pain and spinal convulsions, hypodermic injections of morphia or atropia, or of both combined, may be employed.—WILLIAM A. HAMMOND.

SPINE, Diseases of.—Term "spinal disease" sometimes restricted to caries. Angular curvature is, of course, always described with caries. Besides the above, there are lateral and antero-posterior curvatures, hysterical and rheumatic affections, and spina bifida.

ANGULAR CURVATURE, POTT'S CURVATURE OF THE SPINE, CARIES OF THE SPINE.—These three terms are not quite synonymous, but they are constantly used as such. Caries precedes and causes the curvature. *Causes.*—Scrofolous constitution—male sex in children, female sex in young adults, rare in more advanced life. Often a history of a fall or a blow.* Hooping cough. *Pathology.*—Commences either as simple caries, or as tuberculous disease of the vertebral bodies, or as inflammatory softening of the intervertebral cartilages. As the destructive process proceeds, two striking effects almost always result, viz.: (1) a posterior angular projection of the corresponding spinous processes; (2) less frequently, formation of abscess. As many as six or eight vertebral bodies have been known to break down; usually only two or three are involved. Laminæ, spines, and articular processes escape, but there is a great tendency for them to ankylose together. Collapse of the spine anteriorly at the seat of caries causes the posterior angular projection. Compensatory curvatures in other regions of the spine. Curvature in lumbar disease occasionally lateral as well as antero-posterior. Middle and lower dorsal regions commonest seats of caries. Spinal cord is (1) so small as compared with diameter of spinal canal, and (2) so well protected by its membranes that it is usually unaffected, but in many cases paraplegia, usually motor and partial, and often temporary occurs. The immediate cause is probably inflammatory effusion, or else pressure from a sudden, rapid increase of the deformity. Even aorta may be compressed between the diseased vertebræ as the latter fall together.* Abscess, usually "psoas," in disease of dorsal or lumbar vertebræ. Frequently lumbar. In cervical caries, abscess usually presents towards side of neck, sometimes in pharynx, (retro-pharyngeal abscess). But the pus may burrow in various directions, *e. g.*, into pelvis, buttocks, abdominal wall above Poupart's ligament, and from the neck into the thorax. Psoas abscess passes down in the sheath on the psoas muscle forming a swelling first in the inguinal region of the abdomen, and next in the thigh beneath Poupart's ligament, towards the outer rather than the inner side of Scarpa's triangle. It may extend downwards much farther, and occasionally turns outwards or inwards. Sometimes it is double, *i. e.*, passes down the sheaths of both psoas muscles. Lumbar abscesses perforates the quadratus lumborum, and presents in the loins immediately external to the erector spinæ. Spinal abscess may (1) be absorbed, or (2) after a more or less chronic course, burst, or (3) be opened by the surgeon. When opened, unless antiseptic precautions be taken, hectic fever supervenes. When ankylosis takes place, even the laminæ and spinous processes of adjacent vertebræ unite.

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* See a paper by Mr. Willett's in *St. Barth.'s Hosp. Reports*, vol. xiv p. 325. Out of 60 cases, the assigned cause was a blow or fall in 21 cases, previous illness in 5, and cause unknown in the remaining 34; 14 were strumous subjects; that is, were sickly, delicate persons of strumous aspect.

Symptoms.—In children, the first sign observed is generally a prominence of one or more vertebral spines; but if the lumbar region be affected, no prominence may be discovered till after the appearance of abscess, or signs of general or local weakness and pain. Adults usually remark pain and weakness before deformity. The erector spinæ, rigid at first, soon atrophies. Deformity varies in extent from the slightest degree up to a huge "hump." Compensatory curves in the lumbar and cervical regions make the chin project and the head sink down beneath the shoulders. To take weight off spine, patient supports himself with his hands on his knees. When picking up an article from the floor, he squats down, keeping the affected part of his back rigid. If the atlo-axial joint be affected, he turns his body to the right or left instead of rotating his head. Pain may be absent. In acute cases pain and tenderness are excessive. Often more pain is felt in the side or abdomen than in the spine. Paraplegia may come on, or temporary want of control over the sphincters. Incapacity for, and dislike to active exercise: health suffers in consequence. When abscess opens and chronic septicæmia results, health may break down rapidly, or abscess may dwindle to a comparatively unimportant sinus.

Diagnosis.—Usually easy. Difficult (1) at commencement, (2) when it occurs in hysterical females. A lateral curvature often results from caries of the lumbar vertebræ; but, in this case, there is no rotation, as in true lateral curvature, and there are probably collateral signs of caries, *e. g.*, abscess. Some persons attach importance to eliciting pain by concussing the top of the head, or by running a hot sponge down spine. Stiffness of spine an early sign.

Prognosis.—Favorable as regards life when proper treatment is adopted.

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* See Goodhart, *Path. Trans.*, 1878.

Prospect of undoing angle of curvature hopeless. Paraplegia is frequently recovered from.

Treatment.—Three classes—(1) Rest in bed, (2) movable supports, (3) fixed supports. Also general treatment. Rest in bed essential in the worst cases, *e. g.*, those complicated by paraplegia and abscess; but it is itself injurious by taking away the benefits of fresh air and exercise, and even when in bed the spine should be securely fixed. Spinal supports are of various kinds. If an apparatus be applied, it should be frequently examined and adjusted. Fixed apparatus, plaster of Paris, poro-plastic, leather, paraffin, etc. To Sayre is chiefly due credit of demonstrating their value. He uses bandages with plaster of Paris, applying them from below the anterior superior iliac spines up to the armpits, while the patient is suspended by a collar beneath the chin and loops in the axillæ, his toes only touching the ground. The bandages are made of crinoline. Pads of cotton wool over epigastrium, female breasts, and prominent spines. Tight-fitting Jersey next skin. Patient lies horizontally for an hour after application of jacket (longer if convenient). Similar apparatus applied with patient in supine position (Walker),[*] or suspended from the armpits and hips in prone position (Willett), or in hammock (Davy.)[†] Patient's complaints as to pain, etc., should be attended to, lest a sore form from pressure over projecting spines. The suspending rope should be held by hand, as grown-up people sometimes faint, and require instantly lowering to the horizontal, and little children might get hanged if hooked up and left. Case should be cut up at least once in three or four months; six months minimum of treatment. With a Sayre's case, exercise and play become enjoyable in cases where walking had previously been impossible. In case of pain near the prominent spine, cut a trap-door in the case. When the cervical region is affected, the head should be either suspended from a jury-mast, or supported by a leather collar, well moulded to the chin, occiput, and base of the neck. Use the jury-mast also in upper dorsal cases. Constitutional treatment is conducted on general principles. Cod-liver oil, Parrish's food, seaside, fresh air, sufficient diet, repose, etc.—Abscess. Its opening should be delayed as long as possible; and then strict antiseptic treatment should be carried out.

SPINE, LATERAL CURVATURE OF.—In practice the lateral curvatures which sometimes result from empyema or from lumbar caries, are not included under this head. *Causes.*—Muscular weakness and excessive sitting or standing in a lounging position about the age of puberty. Female sex much more than male. Inequality in length of lower extremities. Rickets. Rachitis adolescentium. (See knock-knee). *Pathology.*—Always a primary and secondary, sometimes a third and fourth curve. Lumbar curve has its convexity to the left, nine times out of ten. Lumbar and dorsal curves together form a line like the italic *S.* Simultaneous rotation of vertebræ, so that in each curve the bodies of the vertebræ which form it are turned toward its convexity. Hence the actual extent of lateral curvature of the bodies is greater than the apparent amount of curvature noticeable by merely examining the spines. Hence, also, the transverse processes on the side towards the convexity are twisted backwards, while those on the side of the concavity turn forwards. Thorax is rotated forwards and compressed on the concave side, and rotated backwards and dilated on the convex side of the dorsal curve. Waist sinks in on concave side of lumbar curve and disappears on the opposite side where its place is taken by a depression halfway up the thorax. Thus in an ordinary case of lateral curvature, we should notice, (1) in the middle line, the row of spinous processes curved with the lumbar convexity to the left and the dorsal to the right; transverse processes prominent on the convexities, sunk in on the concavities; (2) on the left side the waist bulging, a spurious waist caused by a depression in the thorax, and the thorax itself prominent anteriorly, flattened posteriorly, and compressed throughout; (3) on right side the shoulder prominent ("growing out"), the thorax dilated and forming a large swelling posteriorly, the waist sunk in, and the hip prominent. In bad cases the last rib on this side impinges on the iliac crest. It is extremely likely that the immediate cause of lateral curvature is a softened state of the bones due to an affection of the epiphysial cartilages, like that which causes knock-knee. The curvatures become confirmed by the bones themselves altering in shape, atrophying where the pressure is increased, hypertrophying where the pressure is taken off. *Signs* are essentially the naked eye appearances which result from the changes just described. *Diagnosis.*—See Angular Curvature. To distinguish structural from temporal lateral curvature, make the patient bow down low. In the former case the curve in the back persists. *Prognosis.*—Difficulty of cure very great. Severe cases of any duration very nearly hopeless. Even commencing cases require most vigilant management. *Treatment.*—Various plans. Almost all endeavor to combine extension, exercise, and localized pressure. Many forms of final support. Sayre's plastic case. Gymnastic exercises, especially swinging by the hands. Standing and sitting are to be avoided. Rest should be taken in the horizontal position. Attend to the general health. Tonics, fresh air. Treat menstrual irregularities. Of course, search should be made after any possible exciting cause, and its removal effected if possible. Friction to restore tone to spinal muscles. According to my experience, Sayre's treatment at least prevents bad curvatures from getting worse, greatly improves moderate ones, and even cures incipient cases; but daily extension by collar and pulleys is essential.*

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[*] See *Brit. Med. Journ.*, Dec. 1878.

[†] See *St. Barth Hosp. Rep.* vol. xiv.

SPINE, ANTERO-POSTERIOR CURVATURES.—*Lordosis, Kyphosis.* Sometimes arise from causes precisely analogous to those of lateral curvature. Frequently secondary to hip-disease. In Lordosis the concavity is posterior, in kyphosis it is anterior. *Treatment.*—Drilling, careful exercise, with intervals of abundant horizontal repose. Attention to posture. Treat rickets if present. In these cases, Sayre's plaster corset, combined with daily extension should be employed for a considerable time, then left off gradually, the intervals of wearing it being occupied in judicious exercises, frictions, careful attention to carriage, and abundance of horizontal rest.

SPINE, HYSTERICAL.—Sometimes simulates spinal caries in young women. Spasms, paralysis, difficult micturition, local tenderness. But "tenderness is excessive and superficial, so that the patient flinches and complains more when the skin is pinched than when the vertebræ are pressed." There is never found the stiffness characteristic of spinal caries. No proportionate general wasting. Probably weak circulation and uterine or ovarian disorder. *Treatment.*—See Hysteria.

SPINAL BIFIDA.—*Cause.*—Defective development and non-union of laminæ and spines, usually in lumbar region. Excess of cerebro-spinal fluid in fœtal life, according to Lowne. *Pathology.*—Perhaps primarily a local inflammatory dropsy of spinal meninges. At all events, these membranes bulge through defect in spinal canal. Spinal cord or spinal nerves often in the tumor (when present, always in middle line, though often widely spread). Dura mater and arachnoid blend with skin. *Symptoms.*—A fluctuating tumor in median line behind, usually in lumbar region, sessile or pedunculated, often translucent, springing from the bones; may be partially reducible by pressure—such pressure may cause spasms or convulsions. May swell when child cries. Skin thickened and rough, or thin and bluish-red. *Diagnosis.*—It is usually easy to see that a true spina bifida is one. It is not always easy to be certain that a cyst closely connected with the bones is not one. Compare each case with the signs just detailed. *Prognosis.*—Grave. More hopeful when the neck of the tumor is very narrow. *Treatment.*—(1) Palliative (2) radical. Palliative: a leaden shield, well padded and accurately fitting. Radical: three forms, viz., (1) injection of iodine, (2) pressure, (3) excision. Operation very dangerous; and surgeon should be content with palliative measures, unless tumor is getting steadily worse or on point of bursting. Pedunculated tumors offer best prospect of success from injection. An endeavor should be made to isolate sac from general cavity of spinal membranes during injection. Sometimes long-continued pressure, *e. g.*, by Dupuytren's enterotome, will effect this isolation permanently, and thus cure the case. To inject iodine, a part of the fluid should first be drawn off, and then two drops of pure tincture of iodine injected. (See Holmes's System, vol. v., p. 806.) Repeated aspiration may be tried without injection. Morton of Glasgow has been very successful with the following injection: ℞ iodi. gr. x; pot. iod. gr. xxx; glycerini ℥ j. About ʒ ss to ʒ ij is injected through a medium-sized canula. Repeat if necessary. Avoid unnecessary escape of spinal fluid.—C. B. KEETLEY.

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* I speak confidently on this subject, for I have now taken part in the application of nearly seven hundred plaster jackets.

SPINE, Injuries of.—Include dislocation, fracture and sprain. With these should be studied concussion, traumatic compression, and traumatic inflammation of the spinal cord and its membranes.

SPINE, DISLOCATION OF.—*Causes.*—Usually indirect violence, *e. g.*, the back being violently bent forward by a soft body falling on the head of a person stooping. Occasionally direct violence, or even (in atlo-axial region) destruction of the ligaments by disease. *Usual Situation.*—Lower cervical region. *Direction.*—Upper vertebra is almost always displaced forwards. *Signs.*—Mostly "rational" and indirect. The most important depend on injury to the cord: paralysis of parts supplied by nerves given off below seat of injury. Perhaps local pain and tenderness. Shock: collapse at first. In some cases manifest deformity. *Variations in Symptoms according to Seat of Injury.*—(1) Dislocation in lower lumbar region. As a rule, merely partial paralysis of lower limbs or pelvic organs from partial injuries to cauda equina; (2) upper lumbar region—paralysis of lower limbs and sphincters; (3) lower dorsal—paralysis of abdominal wall also; (4) upper dorsal—impaired breathing from paralysis of intercostals; (5) lower cervical—paralysis of every part below neck except diaphragm, respiration entirely diaphragmatic; (6) above third cervical vertebra, *i. e.*, above origin of phrenic nerve—instant death. Of course the higher lesions include all the paralytic effects of the lower. Priapism. Later symptoms: alkalinity of urine and catarrh of urinary organs; bed-sores. These last-mentioned complications cause death eventually. But, in cervical dislocations, death results from obstruction of the lungs by frothy secretion. *Diagnosis.*—From (1) fracture, hardly possible. From (2) mere concussion, by sudden onset, and by nature of course; also by deformity when there is any. *Prognosis.*—Its badness varies directly with the height of the vertebra displaced. High cervical dislocations perish usually in from two to three days, dorsal in two or three weeks. But dorsal may recover, lower dorsal frequently. Lumbar offer hopes even of complete cure. *Treatment.*—Rest on back. Gentle examination and nursing. Gentle extension. Withdraw urine twice daily; wash out bladder if urine become alkaline. (See Bladder, Catarrh of.) Attend to bowels with enemas. The nursing is of vital importance. Smooth, clean sheets, gentle change of position, dryness, daily examination of sacral and trochanteric prominences. Good food. Trephining is for the most part condemned. In certain cases of injury to the spine, especially if in lumbar region, it would be justifiable to apply a plaster of Paris corset during extension. Sayre has published a case of this sort.

SPINE, FRACTURE OF.—Almost every thing written above of dislocations is applicable to fractures. In practice it is very seldom that any distinction is or can be made during patient's life. *Seat.*—More frequent in the cervical region, but common enough in the dorsal.

CONCUSSION OF THE SPINE.—A term applied to a variety of traumatic affection which can easily be differentiated *post-mortem*, and sometimes more or less easily diagnosed during life. They concur in having one common cause, and in tending, so far as the worst cases of each kind go, towards similar, if not identical, terminations. The common cause is injury to the cord without fracture or dislocation of the spine. The worst termination is disorganization of the cord with consequent paralysis. Fortunately most cases stop short of this. Conditions included in the term "*Concussion of the Spine.*"—1. Mere concussion. 2. Compression from hæmorrhage or effusion. 3. Laceration. 4. Inflammation. *Causes.*—Injury, direct or indirect, to the spinal column. Especially common in railway accidents. Blows, falls. *Pathology.*—Amount of visible injury in the cord varies from slightest swelling or ecchymosis to considerable contusions, lacerations, ecchymoses, effusions, and hæmorrhages. Membranes of cord suffer also. Ligaments of spinal column sometimes sprained or torn. At a later stage are found softenings and thickenings, and, still later, atrophy or disintegration. *Signs.*—The most serious symptoms arise much more from secondary inflammation than from the injury itself. Concussion may be localized or diffused. When the injury is localized to one part af the cord, either (1) the rational symptoms are confined chiefly to paralysis or irritation of the nerves arising from that part, or (2) the local mischief is severe enough to damage the functions of all the cord below seat of injury. But the smallest local injury may serve as the starting point for the gravest general disease. In diffused or general concussion the signs are often remarkably vague and insidious. Earliest are lassitude, irritability, "inaptitude," sleeplessness. Then come pains and numbness in various parts. Next, fixed pain in the back and rigidity of the spine announce definitely the presence of spinous or intra spinous inflammation. Then, uncertain gait, general clumsiness, disorders of sight, hearing, taste, or smell, mental confusion, paralysis. *Diagnosis.* (1) From fracture or dislocation of spine. (*See* Dislocation of Spine.) The symptoms are usually less decided, less sudden, and less severe. (2) Form malingering. Sometimes very difficult. Attach greatest weight to objective symptoms, but notice if any of these vary when patient is off his guard. Cross-examine about subjective symptoms; but gross exaggerations are not uncommon even when real concussion is present, so the detection of one falsehood proves little. Test by galvanism. Muscles really paralyzed do not contract properly under galvanism. Extensor muscles usually most affected. *Prognosis,*—When symptoms last long and are extensive, recovery is very unlikely. *Treatment.*—The most trivial case deserves complete rest in horizontal posture till the symptoms have entirely passed away. Prone position preferable. Moderate or low diet. No stimulants. Calomel, gr. v-x. When local pain or tenderness is present, dry cupping. Ice-bags. Pot. bromid. and chloral hydrat. gr. xx-xxx at night. Later stages: Mercury, *e. g.*, liq. hydrarg. perchlor, ʒ j. t. d. s.; or pot. iod. Counter-irritation over spine, blisters, &c. Still later, when active disease in the spine seems to have passed away while its effects remain, employ strychnia, tonics, exercise—passive or active, shampooing, galvanism.*

SPINAL CORD, TRAUMATIC INFLAMMATION OF, } are noticed as secondary phenomena occurring in the course of a case of Concussion of Spine.
SPINAL CORD, COMPRESSION OF, }
(*See* above).—C. B. KEETLEY.

SPLEEN, Amyloid—*See Spleen, Lardaceous.*

SPLEEN, Inflammation of—*See Splenitis.*

SPLENITIS.—*Natural History.*—Primary inflammation of the substance of the spleen is extremely rare in this country. It is common in the East Indies, especially in the low marshy districts of Bengal, and occurs in the paludal districts of other parts of the world. Hæmorrhagic infarctions, occurring during the course of fevers and general contagious diseases, are the most frequent causes of consecutive inflammation and suppuration of the spleen. The disease is seldom seen unless accompanied by ague; and the additional symptoms are tumefaction and some pain of the left side, followed by dropsy. The more common form of diseased spleen is hypertrophy, when it can almost always be detected by palpation or percussion, sometimes extending low down into the pelvic region, well over on the right side of the linea alba, and backwards almost to the spine. In these cases the patient complains of weight and uneasiness, rather than of soreness; his pulse is natural, but the countenance extremely sallow; his person greatly emaciated, his bowels irritable; and these symptoms are for the most part accompanied by œdema of the lower extremities, or by ascites. Hæmorrhage from the bowels, towards the close of the disease, is often so profuse that many pints of blood have been passed or thrown up, greatly exhausting the patient, and rapidly hastening his dissolution.

Treatment.—Iodide of potassium and the bromide of potash are of use. The marked influence of the biniodide of mercury. in the form of an ointment, rubbed into the skin over the surface of the spleen, in reducing its enlargement, is also well attested.—WILLIAM AITKEN.

SPLEEN, Lardaceous.—*Natural History.*—In this disease the texture of the spleen, and especially the Malpighian sacculi, are filled with lardaceous material, so that it is much larger and heavier than in health, and is frequently associated with a similar condition of other organs, especially the liver and kidney, which are characterized by great firmness, a peculiar waxy-like consistence, and with a distinctness and transparency of the Malpighian sacculi which are not usually very obvious.

Lardaceous disease of the spleen is one implying a long-standing and deep-seated cachexia; and, in its most intense form, is seen after protracted caries and necrosis of bone having its origin in scrofula, or syphilis, or even external injury, where the injury leads to protracted bone disease. Hence the question is still undecided, whether the disease arises from a local source, such as the injured bone and the morbid process going on in it, or whether it is a constitutional general disease.—WILLIAM AITKEN.

SPLEEN, Waxy—*See Spleen, Lardaceous.*

SPRAINS.—A class of injuries in which the soft parts of and about the joints are stretched or torn.

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* I would venture to suggest that in the case of many patients, especially those with trival concussion who will not keep the prone positiou, *e.g.*, fractious children, and in the case of other patients convalescing, a plaster of Paris jacket would be useful. Certainly nothing does so much good to the very common injuries of the joints of the limbs to which children are subject; and many cases of so-called "spinal concussion" must be primarily sprains of intervertebral ligaments, while other cases would benefit from thorough local rest

Causes.—Usually a sudden wrench or twist occurring when the patient is unprepared to bring his muscular power to the assistance of his ligaments. Sprains not unfrequently accompanied by fracture, the tendons or ligaments in such cases being stronger than the bony processes to which they are attached. Complete ruptures of a tendon is commonly described as an accident distinct from a sprain. (*See tendons, injuries of.*) Most sprains of severity involve laceration of capsular ligament. Blood is rarely effused into the joint in any quantity, but subcutaneous ecchymosis is very common. Serous effusion into joint-cavity, and inflammatory swelling of surrounding soft parts take place. Pain often excruciating, heat and tenderness—usually best marked at certain points.

Diagnosis.—Is to be made from fracture by a negative evidence. Trust as much as you safely can to your eye, and to the history of the case. Prolonged physical search for crepitus to be much condemned.

Treatment.—Methods apparently diametrically opposed succeed with these injuries. In the great majority of cases nature is thoroughly competent to cure sprains unassisted. Many people "walk them off," as they say. Sprained thumbs habitually get what is really no treatment at all; yet, common and severe as they are how rarely any permanent harm comes from them. On the other hand, almost all the surgical authorities, alarmed by the number of joint-diseases and the like which are attributed (truly, no doubt) to neglected sprains, warn us to fix sprains with wooden or iron splints for weeks. There may be some doubt about the amount of harm to be really attributed to treating sprains by motion; but there can be no question whatever about the mischief done by the abuse of rest. Bone-setters depend for their living upon the orthodox and blind worship of splints. A treatment which will be found very successful (see the writings of Hood, Cowling, Pilcher, and the traditional practices of thousands of the laity) is to supply the place of the torn ligaments by applying carefully and thoughtfully bandages outside the joints, to limit effusion and inflamation by the pressure of such bandages and to secure elasticity and thus permit a certain amount of movement, by means of plenty of good cotton wool, or else by using india-rubber bandage which probably fulfills all the above indications better. This india-rubber bandage, if properly applied, gives great relief in case of flat foot, the pain of which arises partly from a kind of chronic spraining of ligaments and tendons. When the sprain is severe, complete rest for a few days may be desirable, and *severe* exercise should certainly never be allowed till it is quite well. The mobile treatment prescribes, or rather permits, only gentle, regulated, limited movements; and what it chiefly condemns is the continual and repeated resort to splints.* Under such a treatment it sometimes happens that each fresh walking experiment reveals a worse and worse state of things; the patient goes to the bone-setter, submits to a little violence, courageously defies his doctor's warnings, walks about, and gets well. When the treatment above sketched fails, as it will sometimes, then is the time for putting on a plaster of Paris case. The perfect recovery of old sprains is often prevented by the presence of adhesions in or about the joint. Break down these by free movements. If inflammatory reaction is feared, fix up the limb for a few days and apply an ice-bag. —C. B. KEETLEY.

SQUINT—*See Strabismus.*

STAPHYLORAPHY—*See Palate.*

STEARRHOEA—*See Acne Sebacea.*

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* Billroth. Sir James Paget says, "In deciding upon resorting to manipulation in old cases, I believe you will be safe if you will take the temperature of the part for your guidance." Rest is contraindicated when the joint is cold.

STERILITY, in Females—*Definition.*—Barrenness.

Causes.—Absence of uterus or ovaries, occlusion of vagina, vaginismus, occlusion of cervical canal, polypi, anteflexion, pinhole os (?), ovaritis, double ovarian cyst, stricture of oviduct, endometritis, endocervicitis, areolar hyperplasia, membranous dysmenorrhœa, hæmorrhage, growths at the os uteri.

Symptoms, Signs, Diagnosis, and *Prognosis.* According to the cause.

Treatment.—Of absence of uterus or ovaries, none; of occlusion of vagina; of vaginismus; of occlusion of cervical canal; of polypi; of anteflexion; of ovaritis; from double ovarian cyst and stricture of oviduct, none; of endometritis; of endocervicitis; of areolar hyperplasia; of membranous dysmenorrhœa.—HEYWOOD SMITH.

STERILITY, In Males.—Usually a consequence of impotence, *quod vide.* But there are probably cases in which men perfectly virile are yet sterile. No rules can be given for the treatment; but if the surgeon should be consulted on such a case, he should inquire carefully into it, and possibly he may do good, even if it be only by finding that the patient is not really sterile at all.

STERNUM, Fracture of—*See Fractures.*

STILLICIDIUM—*See Lachrymal Apparatus, Disease of.*

STOMATITIS.—*Natural History.*—The mouth, especially in children, is liable to various forms of inflammation, which are named simple, ulcerative or vesicular stomatitis. The simple or erythematous inflammation is generally due to irritation, such as scalds, cold, tartar on the teeth, or gastric derangement. Ulcerative stomatitis, in its milder form (noma), commences at the edges of the gums, opposite the incisor of the lower jaw, by white spots on the gums, which appear spongy and separated from the teeth. Ulceration may then begin and extend along the gums till the jaws are implicated; and as the disease advances, the cheeks and lips begin to swell, the teeth fall out, and the gums becoming gangrenous, the breath becomes fetid (cancrum oris), and there is generally enlargement, with tenderness of the submaxillary glands. Thrush, aphtha, or vesicular stomatitis, commences like simple stomatitis, but spreading ulcers form after each vesicle, and the secretions of the mouth are greatly altered and increased. The adjacent glands become tumid and tender. Diarrhœa may come on and prove fatal to infants, and the evacuations are very offensive.

Treatment.—In simple stomatitis small doses of magnesia, or of rhubard and soda, with or without calumba, will generally correct stomach derangement and cure the disease. In the severer forms the mouth ought to be frequently washed out with such emollient fluids as linseed infusion, dilute glycerine, biborate of soda with mixed honey, or with the linseed or glycerine fluids, creosote, vinegar, carbolic acid and alcohol are also useful applications. In the most severe cases, such as of cancrum oris, chlorate of potash ought to be given internally, to the extent of five grains every four or six hours; and in the solution of the pernitrate of iron internally is also of service. When parasitic thrush prevails, the application of a solution of sulphate of soda (f ʒ i. to f ℥ i. of water) removes the lesion in twenty-four hours. A change of air is often absolutely necessary to convalescence, with the use of arsenic and iodine, and good food, to rectify the faulty nutrition of the child.—WILLIAM AITKEN.

ST. ANTHONY'S EVIL—*See Erysipelas.*

STRABISMUS (Squint).—The visual line is the axial line joining the centre of the object observed, with the centre of its image on the yellow spot of the retina. Deviation of the eye from the visual line, so that the image does not fall on the yellow spot, but on some other part of the retina, is called squint. This deviation may produce double vision—diplopia—when the image formed by the squinting is usually fainter than that of the other eye, and is called the false image. When the false image appears on the same side of the true image as the deviating eye, the diplopia is termed homonymous, when the opposite side the diplopia is crossed. The greater the deviation of the eye the fainter the image appears, as it falls more upon the periphery of the fundus. Patients learn to disregard the false image, and so to use one eye at a time or one eye only. *Causes of Squint.*—(*a*) Ametropia. (*b*) Affection of ocular muscles, as over-action, weakness, paralysis. (*c*) Disuse of eye. Chief kinds are internal and external.

Internal Strabismus (Convergent).—Very common, generally caused by hypermetropia. In hypermetropia the patient is obliged to use accommodation in order to see even distant objects. Now accommodation is always accompanied by convergence, and when a near object has to be seen, the accommodation and, consequently, the convergence used are so great that the eyes deviate internal to the visual line, so that the image does not fall upon the yellow spot, and is therefore not distinct. Patient then fixes one eye upon the object, *i. e.*, causes it to move in the direction of the visual line, whilst the other eye still deviates. The amount of deviation is measured by the distance between two vertical lines, one bisecting the pupil, the other bisecting the eyelids. *Diagnosis.*—In well-marked cases let patient look steadily at the tip of index finger placed about a foot in front of eyes, then screen each eye successively, and watch the eye thus screened. The squinting eye makes a decided movement towards the visual line when the working eye is covered, but the working remains quite stationary when the squinting is screened. In less marked cases the diagnosis is more difficult. Take patient into dark room and direct him to look steadily at lighted candle at distance of ten feet without moving his head. Place a piece of red glass in front of one eye, then if diplopia be present the image of this eye will be red and that of the other eye of normal color. The distance of these images apart and their relative position gives the character of the deviation—homonymous diplopia indicating convergent, and crossed diplopia indicating divergent strabismus. *Treatment.*—1. If the patient be hypermetropic, if squint be slight and of recent date, and if vision be good in both eyes, try the effect of well-fitting convex spectacles for one or two months. 2. Perform tenotomy of the internal rectus of one or both eyes. Both eyes generally require to be operated on. *Operation.*—Separate lids by stop-speculum, let assistant turn eye outwards by forceps, with toothed forceps pinch. fold of conjunctiva between cornea and caruncle, with squint scissors cut through this and through the capsule of Tenon, pass squint hook beneath the tendon from below and cut it through between hook and globe, pass in the squint hook a second time to be quite, sure that the tendon is divided; suture for conjunctival wound is not generally used.

External Strabismus (Divergent) is the result of weakness of the internal rectus; commonest in myopia; occasionally occurs in hypermetropia; sometimes occurs in a blind eye; may follow tenotomy of internal rectus where too much sub-conjunctival tissue has been divided; common in partial or complete paralysis of the third nerve. *Treatment.*—If resulting from paralysis, try and find the cause of paralysis and treat this; if not, perform tenotomy of the external rectus, and if necessary also, at the same sitting, perform the operation for readjustment or advancement of internal rectus.—Henry Juler.

STROPHULUS, or Red Gum.—This term has been applied to many different eruptions, consisting of soft red papules in infants; in one case, to hyperæmic papillæ, in another to hyperæmic sweat glands, and again to distended sebaceous glands. So-called strophulus, characterized by bright-red points, seated on the face and arms of children, is, in fact, a hyperæmia of the papillæ or sweat glands, mostly induced by the child being kept very much wrapped up, and so overheated. S. albidus is the term given to the small pearly-white specks seen about the face of children, and due to distended sebaceous glands. The hyperæmic states alluded to above are exaggerated by any stomach disturbance.

STROPHULUS PRURIGINOUS is a modification of lichen urticatus. When, in ill-nourished children, that disease becomes very chronic, the "wheal" or "urticarial" aspect may give place to the "pruriginous" almost, if not entirely, and when the skin is covered pretty uniformly with the pruriginous papules only, then the condition known as strophulus pruriginosus is present. At least this is the history of cases I have seen, though I notice Duhring states that Hardy recognized a case of true prurigo as one of S. pruriginosus.

Treatment.—Some mild aperient and antacid should be given, with the adoption of a cool regimen, and the local use of some simple soothing lotion. S. pruriginosus needs locally simple baths, followed by inunction of oil, generous diet, and cod-liver oil and iron internally.—"*Epitome of Skin Diseases*"—*Fox.*

ST. VITUS' DANCE—*See Chorea.*

STYE—*See Eyelids, Diseases of.*

SUDAMINA—*See Miliaria.*

SUNSTROKE.—*Natural History.*—an affection characterized by vertigo, sometimes with headache, the gradual accession of listlessness and torpidity with a desire to lie down. These febrile phenomena may culminate in more or less sudden and complete insensibility, without the power of sense or motion, the breathing rapid, and getting more and more noisy as death approaches. Convulsions of the extremities usher in a complete state of coma, in which the patient gradually dies. The approach of death is indicated by the failure of the heart's action, the fluttering of the pulse, the irregularity of the respiration; and the fatal event may supervene within five minutes to a few hours after the disease has become fully expressed. Death is either by syncope, apnœa, or by a combination of the two. In cases which recover, various sequelæ are apt to supervene, such as forms of paralysis, more or less complete, choreic movements, melancholia, and other forms of insanity.

The disease has been described under a great variety of names, *e. g.*, heat apoplexy, heat asphyxia, coup de soleil, insolatio, ictus solis, and lastly, erythismus tropicus. Notwithstanding that sun heat and the sun's rays have been considered the main agent in producing this disease, it is not less true that the full expression of the disease not unfrequently occurs at midnight. The name implies a common, and certainly a most powerfully exciting cause of a disease which has been variously and erroneously described as of the nature of apoplexy, or of some form of continued fever; and a very great variety of views have been put forward regarding the pathology of this remarkable disease.

The effects of protracted exposure to intense heat in a body of men in the field, debilitated by fatigue and want of rest, are efficient conditions in the production of sunstroke. The effects of protracted exposure to intense heat in a body of men may operate upon them equally deleteriously when in quarters, and are also not less efficient causes of sunstroke.

The characteristic feature with regard to atmospheric temperature, is the little variation of it night or day. In the absence of rain the ground and buildings become so heated that, long after sunset, the radiation of heat maintains a high temperature within doors. Prolonged high atmospheric temperature is recognized as the essential cause of the attack; but nervous depression from solar exposure, fatigue, and previous illness, are associated with that prime or essential cause.

Another most important element of causation is the influence of vitiated air when men are congregated without sufficient ventilation. One-third of the cases, and nearly half the deaths, occurred under such circumstances; so that in quarters, the predisposing causes of sunstroke may be comprised in—(1.) Prolonged atmospheric heat, with a dry and rarefied state of air; (2.) nervous exhaustion; (3.) a contaminated atmosphere; while (4.) an increase of the average prevailing temperature sufficed to act as the more immediate exciting cause of the development of sunstroke.

The symptoms of the disease are thus liable to be greatly modified by accidental causes, and these phenomena which are most prominent under one set of circumstances are either absent altogether under another, or so very much less urgent as scarcely to attract observation—that the disease, in fact, varies in several important points according to the nature of the circumstances in which it occurs.

Generally it may be said that the affection seems gradually induced by protracted exposure to extreme heat in a dry and rarefied air, combined with a vitiated atmosphere from defective ventilation, or with physical exertions of an arduous character, implying excessive fatigue of extreme duration, so as to bring about great debility and weariness of the body. Sleep at last cannot be obtained, or it is greatly interrupted, and of short duration. Deterioration of the general health is thus progressive, while altered looks and loss of flesh indicate extreme exhaustion. The skin becomes rough and scaly, and perspiration ceases. The heat of the surface increases to an intense degree. The bowels tend to become obstinately constipated. The urine becomes copious and the calls to pass it frequent; or even incontinence may prevail. Sudden and remarkable elevations of temperature are recorded; for example, a temperature of 104° Fahr. in a fatal case, two and a half hours after admission to hospital; a temperature of 104° Fahr. in a case which recovered; a temperature of 109.22° Fahr. in a fatal case, one hour after admission; a temperature of 109.04° Fahr. in a man fify-five years of age, who recovered; and a similar record of a man aged forty. One case is said to have reached as high as 113° Fahr. Temperatures of 103°, 104°, and 105° Fahr. are not uncommon a few hours after the attack commences; and cases with temperatures as high as 109.04° Fahr., ending is recovery have been published.

In the cases which terminate favorably a gradual remission of the urgent symptoms takes place; but the irregularity of the heart's action and oppressed breathing may persist during the next day; and if the patient has been exposed to the influence of malaria, paroxysmal febrile phenomena may supervene. The patient cannot be considered free from danger till the skin becomes cool and moist; indeed, a relapse of all the worst phenomena may occur even after free perspiration and sleep have been procured.

Treatment.—Keeping in view the nature of this disease and the various mode in which death may approach, the line of treatment must be as follows: When death tends to occur suddenly from syncope there is little opportunity afforded for treatment but the measures indicated are—the cold douche, keeping the surface wet and exposed to a current of air, or assiduously fanned, exclusion of light as far as possible, the immediate employment of stimulants, external and internal, by the rectum as well as by the mouth. Depletory measures of any kind are not to be thought of. In the less rapidly decisive cases prompt treatmen is of the greatest use; while delay is fraught with the greatest danger. The patient must be immediately stripped of his outer clothing; and, being placed in a semi-recumbent position, the cold douche is to be applied, from a height of three or four feet, over his head and along his spine and chest, his extremities being at the same time sponged over with cold water. Relaxation of the pupil is the first symptom that shows the good effect of the treatment, which may require to be repeated several times, on account of returning insensibility but if there is any evidence of failure of the pulse, this treatment must be discontinued, and the application of cold to the head is then all that can be borne. Stimulants administered by the rectum may counteract the tendency to prostration. The hair is to be cut short as soon as possible, and a blister applied to the nape of the neck, the surface having previously been well sponged over with the acetum lyttæ. When the first violence of the attack is subdued, increasing confidence in the ultimate result may be indulged in so soon as vesication takes place; and in cases where insensibility recurs, after an interval of ten or twelve hours, it may be removed by the application of a second blister to the vertex; which may be again repeated, there being no doubt as to the good effect it produces. A blister may also sometimes be applied along the spine in the worst cases. Stimulation by the use of the electro-galvanic current, with the moist sponges applied along the sides of the neck, chest, and epigastrium, ought also to be employed. Sinapisms ought generally to be applied to the extremities, and to the chest or sides.

As soon as possible after the employment of the douche, a strong purgative enema ought to be given, those of a stimulant nature being preferred. But as the enema may have to be repeated several times before any effect is produced on the bowels, it may be advisable to let the first enema be of a simple purgative character; and afterwards let it be followed up by turpentine enemata.

If cerebral functional disturbance is indicated by the state of the eyes, already described, a few leeches to the temples may relieve the congestion; but the prevailing opinion among officers of experience in the treatment of this disease is against the employment of blood-letting by venesection, even in severe cases. In all the cases which have been recorded in which it has been employed, it seems to have been generally hurtful, and to have hastened the fatal termination.

In cases where the breathing is much oppressed, and the bronchial tubes loaded with mucus, the patient should be turned occasionally over on his face and side.

In the convulsive form of the disease, where the greatest irritability of the nervous system prevails, the douche is found to be inadmissible, from the agony which it occasions. In such cases Dr. Barclay has seen great benefit from the inhalation of chloroform. After a few inspirations the convulsions for the most part ceased, and sleep was very easily induced; but in one or two instances, after a considerable interval of consciousness, febrile symptoms increased in severity, coma supervened (probably effusion having occurred within the cranium), and was followed by death. But the cases in which chloroform can be used are comparatively few; and very great care is necessary in its employment, so that the inhalation may be suspended at once, as soon as any effect is produced upon the pulse.

In the most severe forms of sunstroke the principle of management is to reduce as quickly as possible the blood-heat. This is best effected by rubbing the body over with ice, as large as can be handled. Tepid body baths, with cold affusion to the head and back of the neck, or general cold affusion, may be employed. Keeping pieces of ice in the axilla is also of use, until there is returning consciousness, which may not be for several hours, and, therefore, great caution is required in such use of ice, so as not to induce gangrene of the skin.

The *sequelæ of sunstroke* are generally persistent headache, fixed or shifting, pain in the back, choreic movements of the forearm and hand, convulsive disorders, mental weakness. These symptoms are suggestive of hæmatoma of the dura mater, as a probable lesion in such cases, and indicate rest, attention to the functions of the skin, and change of air. When the pain is fixed and severe, long-continued counter-irritation at the nape of the neck, and a course of iodide of potassium may benefit the patient; but many cases are quite unrelieved by treatment, as the records of the invaliding hospital at Netley show every year.—WILLIAM AITKEN.

SURGICAL RASH.—Occasionally, a few days after an operation, a roseolar rash appears over the body, attended with sore throat, high temperature, and other constitutional symptoms. Although mention of the affection has not been made under Scarlatina, there are many who believe it to be identical with this disease. The symptoms, it is true, have not been distinguished from those of scarlatina, to which it bears the closest resemblance, but sufficient evidence to prove their identity has not yet been adduced.

SWEAT, Bloody—*See Hæmatidrosis.*

SYMBLEPHARON—*See Eyelids, Diseases of.*

SYNCOPE.—The cardiac failure (which always takes place to some extent) is commonly referable to causes, mental or physical, operating through the nervous system; the heart becomes more or less completely paralyzed, and contracts feebly or not at all upon its contents. In some cases, however, its failure to act depends upon the presence of some mechanical impediment to its action, as when it is compressed by rapid, serous effusion into the pericardium, or by the escape of blood into that cavity, or as when sudden obstruction of one of the cardiac orifices by a clot or embolus takes place, or the patient is suffering from obstructive valve disease. Hearts enfeebled either by dilatation or by fatty or other forms of degeneration, or by abundant or dense pericardial false membranes, are especially liable to failure of action, and are necessarily more liable than others to suffer under the influences of those causes of failure which have been previously enumerated.

Treatment.—A patient suffering from syncope should be placed in the horizontal position, all ligatures should be removed from the neck and elsewhere, and he should be freely exposed to cool fresh air. Ammonia, or other such stimulants should be held to the nostrils; ammonia, ether, or alcohol administered by the mouth; or if they cannot be swallowed, these or turpentine should be given in the form of enemata; cold water should be dashed in the face, either from a jug, or by means of a wetted cloth or towel, and sinapisms applied to the epigastrium and to the limbs. If death seems imminent, it is important to promote the action of the lungs and heart by frictions, and it may be necessary to employ artificial respiration, to stimulate the heart by galvanism, or, if the veins be distended, to bleed from the external jugular vein. If syncope be the result of profuse hæmorrhage, the question of transfusion naturally arises. Whenever the syncopic condition assumes a chronic form it is important to maintain the bodily temperature and to prevent the patient from making any kind of exertion. Then, too, the gradual improvement of the patient's vital powers by the judicious exhibition of nourishment and the assuagement of vomiting and all other symptoms which tend to impede this improvement, become objects of the highest importance. The value of iron and of other tonics in promoting restoration to health, and of opium or chloral hydrate in remedying sleeplessness, excitement, or delirium need scarcely be insisted upon.—JOHN SYER BRISTOWE.

SYCOSIS, which must be distinguished from tinea sycosis, a vegetable parasitic disease, consists of simple inflammation of the hair-follicles and sebaceous glands. The disease seems to commence in the follicle or in the tissue outside, and to implicate gradually the glands. There is considerable redness, swelling, and suppuration, and if the disease be neglected the glands will ulcerate out, and leave a thin, shining cicatrix, on which the hairs never grow again. The causes are various. Irritation of any kind, as shaving with a dull razor, or the application of irritating washes, may produce sycosis. The disease is remarkably obstinate, and may last for years.

Treatment.—The hair should be cut close and epilated early, and if suppuration have taken place small scarifications should be made. By epilation the disease may at once be cured, or at least greatly checked; and it is vain to hope for any good effects so long as the hairs remain to keep up the irritation. Tonics and arsenic in some form will also be found useful in the later stages.—FREDERICK T. ROBERTS.

SYNOCHA—*See Febricula.*

SYNOVIAL RHEUMATISM.—A rheumatic affection, in which an accumulation of non-purulent fluid occurs in some synovial sac, especially that of the knee-joint. One joint, generally, is alone affected, and the synovia is altered as to quality Great irritation exists in the surrounding tissues; and structural changes are apt to occur in the capsule of the joint—sometimes eventually involving the cartilages and joint-ends of the bones.

SYNOVITIS—*See Joints, Diseases of.*

SYNOVITIS, Gouty—*See Chronic Gout.*

SYPHILIS.—The attention of the medical profession was first invited to consider the subject of the physiology of syphilitic infection, in a paper read before the New York County Medical Society in June, 1871, and again attention was called to this subject in another paper before the same society in May, 1872—the latter on the physiology of syphilitic infection as applied to the successive manifestations of the disease.

In the first paper it was shown, by citations from leading authorities throughout the world, that there was at that time an entire lack of harmony in regard to their views as to the nature of syphilis and in the manner in which the human system was infected with it; that, in regard to the various leading doctrinal points, an almost equal number of distinguished authorities were diametrically opposed to each other. The virulent nature of the disease was generally agreed upon. Inoculation of the secretions of one suffering from syphilis was accepted by all as a necessity for the production of the disease. Unanimity on this point had resulted from extended and studious clinical observation. Here, however, unanimity ceased, and at the first approach to a consideration of the physiology and pathology of the disease, division of opinion ensued. Two great parties arose: on claiming that on the instant of contact between the so-called virus of syphilis and an abraded surface on a healthy human subject, the entire organism became pervaded—permeated with the disease; not only independently of all known physiological processes, but in defiance of all physical laws. While the other party insisted that a distinct interval, one of several days, always elapsed between inoculation and constitutional infection. The chancre or initial lesion of syphilis was claimed by the first party to be the result of the general infection, manifesting itself by a local reaction at the point of original contact or inoculation: while the second claimed that the chancre was the first and only direct result of the application of the virus, and that the constitutional affection resulted through a gradual invasion proceeding from this point. The one *claimed, as did Auspitz* and Kolliker in 1879, as a result of clinical experience, that excision of the chancre may wholly prevent the occurrence of constitutional infection; while the other, with Berkeley Hill, insisted, from most positive personal experiment, that destruction of the lesion of inoculation is wholly useless in preventing general syphilitic infection.

The fact that these parties were then and are to-day thus opposed on vital practical issues is a sufficient commentary on the value of purely clinical experience in deciding questions involving observations on important physiological and pathological processes.

Instruments of precision have become essential to progress in every department of science, whether in the organic or in the inorganic world. What the telescope has done for astronomy, the microscope has done and must continue to do physiological and pathological science. The researches of Virchow, of Stricker, of Wagner, Billroth, and Rindfleisch, of Biesiadecki, Cornil and Ranvier, Beale, Chauveau, Burdon Sanderson, and some score of other distinguished scientific workers with the microscope, have during the last quarter of a century, thrown floods of light into the mysterious processes of the human organism in health and disease. But we look in vain through the numerous works on venereal diseases which have been issued during that time to find the advances in pathology and physiology applied to the adjustment of the great and much vexed question of syphilitic disease

It was with the avowed object of bringing such knowledge, scattered through the literature of that period, to bear upon these matters, that the physiology of syphilitic infection became a subject of study, and subsequently, of the papers referred to as having been presented by me to the profession over ten years ago. Since that time I have neglected no known opportunity of availing myself of every personal clinical experience and of all advances in physiology, histology, and pathology which might promise support to or which might tend to overthrow the materialistic position which I had felt impelled then to assume, as against the supernatural views held by accepted authorities. My effort was made in the direction of placing the question of syphilitic infection upon a rational footing, and was then based chiefly upon the published investigations of Beale, Burdon Sanderson, and others in regard to small-pox and vaccinia, the cattle plague, and relapsing fever. These gentlemen claimed to have demonstrated by microscopic examinations that a living germinal cell was the starting-point of the disease in each case; that this cell possessed the power and properties of the human white blood corpuscle, in so far as growth, movement, and proliferation were concerned; that it was much smaller, more active, and, though less tenacious of life, was still capable of maintaining its vitality after removal from its seat of development and deposit upon another locality, so only that a suitable pabulum were furnished. Beale also claimed that another cell with similar properties and powers, and descended directly from degraded cell elements of human origin, was the starting-point of syphilis.

The well-known fact that all efforts made previously to this claim and subsequently to it, and they had been numerous, had failed to discover the physical entity or representative of the so-called syphilitic virus did not then, and does not now, militate against it, from the fact that only something foreign to the normal tissue elements has been looked for.

This degraded human germinal cell of Beale was represented as varying in size from a five thousandth to one hundred thousandth of an inch in diameter, with nothing in its composition or in its physical properties to distinguish it from the nuclei, the nucleoli, or the granular bodies of the normal white blood cell.

With nothing but its morbid activity and increased capacity for proliferation to distinguish it from the normal cell elements—being itself, in point of fact, a diminutive white blood cell—it is not surprising that such a cell, as a disturbing element in the blood, in the tissues, and in the nutritive fluids of persons affected with syphilis, should have eluded microscopical research. The signal failure of Lostorfer and others to discover any peculiar or substantial virus, had left the subject of syphilis in the same obscurity as when Fernel, in the middle of the sixteenth century, classed it with the poisons of hydrophobia and the plague as "A mysterious power to enter and vitiate the blood." In all the works on syphilis which I was able to consult, there was no evidence that any distinct connection had been recognized between the initial lesion and the subsequent manifestations of the disease. Each one of these even stood separate and distinct from every other. The simple clinical fact that the initial lesion was the first tangible evidence of the disease, and possessed certain marked physical characteristics, was noted; that, after a mysterious period of rest, enlargement and induration of adjacent lymphatic glands succeeded; that, after another unexplained interval, a cutaneous efflorescence occurred, accompanied perhaps by a pharyngeal congestion, possibly by ulceration of the tonsils. Then, possibly, after still another mysterious interval, a papular eruption of the skin and mucous membranes appeared; possibly, falling of the hair, inflammation of the iris, periosteal pains; all, or neither; then, after another and a longer mysterious interval, deposits of an anomalous material, called, from its viscid and gelatinous appearance, "Gumma," in the skin, in the testes, in the tongue, in the bones, and in the viscera—producing trouble, sometimes apparently by mechanical pressure, and again giving rise to extensive and unexplainable deterioration or absolute destruction of tissue. But beyond a physical description of these various lesions, and the information that all were caused by the mysterious gumma, no information was afforded. They were summed up as syphilitic manifestations of the different periods, without any attempt at explanation on a basis of known physiological or pathological laws. Therefore, any new view of the subject which could afford even a plausible explanation of the various manifestations of syphilis, in accordance with recognized laws of physiological and pathological science, could not fail to constitute an advance upon this position of acknowledged ignorance in regard to the nature and behavior of syphilis.

The acceptance of the disease germ of Beale, in the first place, furnished a starting-point in harmony with what was known of other contagious diseases, vaccinia, variola, etc. In the second place, it furnished an influence which could be demonstrated as capable of combining with the human embryonal cells whose origin, in recognized measure, and whose especial habitat was in the lymphatic organs and channels, already accepted as prominently involved in the course of syphilitic disease. It was also a point of no small value that, from the embryonal nature of this disease germ, it could only combine with embryonal elements, and that thus, the formed material—the red blood corpuscles and the tissues of the body—could not be directly affected by it, but that its infecting influence must be confined to the white blood cells of the organism. This at once furnished a reasonable explanation of the strange and well-known fact, that persons the subject of syphilis might be in good general health, following their ordinary occupations, pursuing their pleasures even, while fully permeated, according to the professional as well as the popular idea, with the syphilitic virus. In the third place, with the embryonal disease germ as a starting-point, the disease could only progress through the natural lymph-channels, the lymphatic spaces and vessels which return the excess of embryonal material from any point in the tissues to the general circulation. The disease would therefore be confined to the lymphatic elements in its *inception, and virtually to* the lymphatic system.

Vague statements had been made by different authors in regard to the probable method through which the general organism was infected by syphilis, but Alfred Von Beisiadecki, of Krakow, was the first to make a suggestion based upon actual scientific microscopical examination of the histological elements of syphilitic tissue. The results of these observa- made by Beisiadecki and E. Verson, were published in the Archives of the Academy of Sciences of Vienna in 1867, one year after Beale's announcement of his views in regard to the degraded white blood corpuscle as a starting-point for syphilis.

Beisiadecki says, "I have studied the Hunterian chancre in twenty specimens.

"The induration consists in a cell infiltration of the papillæ of the corium and subcutaneous tissue. The infiltrated cells are similar to those in dermatitis. They are round, have one or two nuclei, have a finely granular protoplasm, and separate the connective tissue equally.

"These fibres retain their normal size; they are not infiltrated as in dermatitis; they are apparently denser and more resistant to chemical reagents. But the arrangement differs from that in dermatitis.

"In those places where a rich cell proliferation has taken place, and in their vicinity still more, we find the neighboring tissue of the vessels, as well as of their walls, abundantly infiltrated with cells. The walls of the capillary vessels of the papillæ are thickened, have a shining and rigid appearance, and inclose numerous nuclei which project even into the lumen of the vessels. The adventitia of the arteries and veins is three times its normal thickness, in consequence of the presence of numerous round, spindle-shaped, and branched cells. The calibre of the vessels is diminished, but the vessels are permeable. If the induration still increases, we find in its vicinity an abundant proliferation in the adventitia of the vessels, and subsequently the adjoining connective tissue-cells enlarge and proliferate. . . . The induration, however, is explained," he further remarks, "neither by the number of cells nor by their peculiar properties, but by the fact that, while in dermatitis we have a proliferation of cells, and also a serous exudation which infiltrates the tissue cells and fibres, in the induration of syphilis we have a dry anæmic tissue, resistant connective tissue fibres, considerably thickened walls of vessels. The dryness of the induration which produces the hardness and also the anæmia is caused by proliferation in the walls of the vessels, which makes it difficult for the serum to leave the vessels and also diminishes their calibre. And this," he says, "explains why the syphilitic induration breaks down into a molecular mass, and why resorption takes place so slowly. This investigation," Beisiadecki further remarks, "might give us a clue to the mode in which the organism is infected." And again he says, "In consequence of experiments on animals and man, we came to the conclusion that the blood capillaries are surrounded by perivascular spaces, and that the adventitia of the bloodvessels is in part to be regarded as belonging to the lymphatic system. We have seen that the cells of the adventitia are in a condition of proliferation—the larger lymphatic vessels appear as thick cords on the dorsum penis, and the corresponding glands take part in the process. These cells formed in the lymphatic system can easily enter the lymph current and the blood and become the carrier of the contagium." From this he concludes that "the infection of the organism is not caused by the absorption of fluid or of broken-down substances in an unknown way, but the progressing inflammation of the lymphatics and glands, and the formation of cells in them, and the entrance of these cells into the lymph current as living elements, may be regarded as the cause of the general infection."

Beisiadecki does not appear to have been cognizant of Beale's view, ublished in the preceding year; nor did I meet the account of Beisialecki's investigations until four years subsequent to my adoption of the disease germ of Beale as affording the most probable solution of the mode in which the syphilitic infection was initiated. From a careful study of Beisiadecki's statements it would appear that a local and excessive proliferation of white cell elements characterized the earliest evidences of the syphilitic process; that it progressed chiefly through the lymphatic spaces and vessels; that the induration and also the breaking down of the tissues at the point of inoculation was caused by obstruction of the vessels of nutrition of the part through the dense cell accumulation. This behavior of the tissues at the point of inoculation—the recognized tendency of the proliferation to progress in the line of the lymphatic vessels—suggested to Beisiadecki that it "might furnish a clue to the manner in which the organism was infected." It convinced him at least that the infection was not caused by the absorption of any subtle emanations or fluid or broken down substances, in an unknown way; but the formation of cells in the lymphatics and glands, and the entrance of these cells into the lymph current as living elements, might be regarded as the cause of the general infection.

Let us now consider the capacity of the degraded white blood corpuscle —the syphilitic disease germ—claimed by Beale to produce the conditions which Beisiadecki and Verson found in the initial lesion of syphilis; let us follow the natural course and influence of a disease germ corresponding to the degraded white blood corpuscle of Beale from a surface of inoculation, side by side with the clinical and microscopical evidences and lesions of syphilis throughout the course of this disease.

Depositing now this disease germ upon the surface of an abrasion occurring as from a recent venereal accident—it is at once immersed in the tissue fluid which the abrasion furnishes, thus affording pabulum suitable for its continued growth and its rapid proliferation. Its contact with the wandering white blood cells which the local irritation has drawn to the part is assured. The known capacity of such cells to receive into their substance the almost infinitesimal germs and to proliferate at increased speed on account of their presence, warrants us in assuming the possibility—nay the probability—of such a result. Now we are assured by well-authenticated microscopical investigation, that this is exactly what does take place in an actual syphilitic inoculation, viz., that an increased local proliferation of the white cell elements begins and goes on steadily until a nodule of induration is formed, which is accepted by all as characteristic of syphilis. The nodule is made up, according to Beisiadecki and others, solely of white blood cells and the product of new formation resulting from the enforced stasis of those cells. The initial lesion of syphilis is thus shown not to proceed from a destructive process, but from a process of growth; and it is a well-known fact that the mass of cells thus proliferated may exist for weeks and finally become absorbed without showing the slightest tenderness or tendency to ulcerative action; and yet the person upon whom such accident occurs becomes just as certainly and thoroughly the subject of constitutional syphilis as when the initial lesion was an open tissue necrosis. And further: it is also found that when suc tissue necrosis—or more properly, necrobiosis—does take place in the uncomplicated initial lesion of syphilis, this accident is due solely to inte ference with the vessels of nutrition of the part, caused by the proliferatio and packing of cells around the vessels, in their walls and within the lumen, and not from any destructive property residing in the contagio element of syphilis.

The period of so-called incubation of syphilis (really the time which tervenes between the date of inoculation and the implication of adjac lymphatic glands), in this view of the case, is occupied by a steady cell proliferation at the point of inoculation. This period is apparently longer or shorter in proportion to the distance from the surface of inoculation to the nearest lymphatic vessel. Clinical observation, confirmed by microscopical examination, has shown that during this period, no physical evidences of any diseased action are ever seen in any other part of the body, and that all claims as to the vitiation of the entire organism at the moment of inoculation are without the slightest foundation in fact. An extended clinical experience has also shown that the period of incubation is shortest in those cases where the wound of inoculation is at a point corresponding to the most superficial distribution of lymphatic vessels, notably at the frænum præputii, where the lymphatics lie just underneath the epithelium. Cases of inoculation under such circumstances have been recorded as having had an incubation of but from one to four days; while in a single instance, quoted in my first paper on the physiology of syphilitic infection, a well-known surgeon received a syphilitic inoculation by the prick of a spicula of bone, during an amputation in a syphilitic subject; gland enlargements of the axilla occurred within twenty-four hours, and were followed by a syphilitic roseola six weeks after.

The movement or current of the fluids pervading all living tissues is shown by scientists to be in a direction towards the lymphatic vessels. The tissue spaces are even claimed to be in open communication with the lymphatic canals. The direction of the current in these canals is of necessity from the periphery of the body towards the great central lymph reservoir—the receptaculum chyli. The office of the lymphatic vessels, as stated by a great German histologist,* is to act as drains for the surplus nutritive material; in other words, to return to the blood the nutritive material exuded into the tissues in excess of the necessities of growth and repair, again to be carried into the tissues by the arterial vascular system. The necessity of germinal cells thus present in the tissues would be to progress towards and finally into the lymphatic vessels, thence into the lymphatic channels, and thence into the nearest lymphatic glands.

Clinical experience has shown that recent painless enlargement of lymphatic glands is suggestive of syphilis, and, when taken in connection with a suspicious lesion upon the genitals, is accepted as a proof of the syphilitic cause for that enlargement. Clinical observation, then, coincides with the hypothetical case with which we started, in showing that, as a matter of necessity, the enlargement and induration of the lymphatic glands in direct connection with the lesion of inoculation must soon follow. Actual microscopical examination of glands so enlarged show them to be literally stuffed with the products of cell proliferation, and that the swelling and induration are due to this cell accumulation which, under the microscope, does not differ in the least from that found in the initial lesion.

Up to this point, according to the usage of authorities, the disease has been termed the primary stage of syphilis. With the purpose of signifying its purely local character, as here claimed, and in view of its apparent progress by a gradual cell proliferation, the term "*iniatory period of syphilis*" would seem to be more appropriate.

Now, in the natural history of syphilis, following immediately upon the primary or initiatory stage of the disease, another mysterious period of rest, or so-called incubation, occurs, a period averaging fully six weeks. During this time the subject of syphilis, who had been claimed by the advocates of the supernatural views of syphilitic infection to be saturated from heel to crown with the syphilitic virus, is yet seen to be free from every physical sign of syphilis, and from all discomfort at every point, except perhaps that between the lesion of inoculation and the swollen and indurated glands. During this second incubation, however—as has been shown in the first so-called incubation—the cell accumulation is going steadily on, packing the canals of the glands so tightly that passage of a cell through them would appear an impossibility. But that this is finally effected, and that this period of so-called incubation is really due to the time required for the diseased cell elements to effect a passage through the glands, is shown by the fact that, at about the same time, between thirty and forty days, in every case, lymphatic glands at a distance from the seat of inoculation, as in the cervical and epitrochlear regions, suddenly become enlarged through cell accumulation, exactly the same as was found in the glands in immediate connection with the lesion of inoculation, and that about this time a roseolar eruption of the skin occurs which is considered diagnostic of syphilis.

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* Rindfleisch, Pathological Histology, Am. Ed., page 92

The course of the hypothetical disease germ, as shown, would, of necessity, be towards the great lymphatic reservoir—the receptaculum chyli. May we not claim that the six weeks' delay in reaching it arises from known mechanical obstacles in the substance of the gland, and corresponds reasonably with the so-called period of second incubation; and that, once arrived within that reservoir, it is carried with a myriad of cells—similar cells—degraded by contact and combination with the original disease germs or their descendants, in their passage through the glands, along with the lymph current, and poured, with the normal lymphatic elements, into the general circulation through the subclavian veins?

Thus suddenly set free in the general blood circulation, we naturally expect now to find evidences of constitutional disturbance resulting. And now, in point of fact, for the first time in the history of the infection, does the patient begin to complain, not always, but occasionally, in severe cases, of headaches and general malaise, etc.,—called the syphilitic fever. In whatever manner these troubles are accounted for, it must not be forgotten that the same cell accumulation which has marked the progress of the disease from the point of inoculation to the receptaculum chyli has commenced, and is steadily progressing in the general lymphatic system—a system of vessels and glands, the known source of embryonal elements most necessary to the healthful nutrition and growth of the human organism. The roseola of syphilis is claimed to account for the so-called syphilitic fever; but in the great majority of cases the roseola appears without the slightest constitutional disturbance, and when the constitutional disturbance is present, the appearance of the roseola does not relieve it in the slightest degree. It is, therefore, unlike the disease and the eruption of scarlet fever and measles, with which it has been compared. It corresponds exactly, however, with the sympathetic roseolas, of which Mr. Erasmus Wilson, the great English dermatologist, has described no less than sixteen varieties, dependent upon impressions upon the great sympathetic nerve, producing paresis of the nerves of cutaneous bloodvessels, through various causes, such as typhoid fever, rheumatism, gout, indigestion, mental emotion, etc.

It is true that Mr. Wilson does not recognize the roseola of syphilis as of this character; on the contrary, he has taught, most explicitly, that this especial roseola was the result of an effort of nature to expel what he termed the syphilitic poison, and described it as "the exanthema which completes the triumph of the pressure from within, and is the sign that the poison is being driven to the surface, and is in process of expulsion.

No better example of the disposition of authorities to attribute the manifestations of syphilis to purely unscientific and supernatural causes than the above could be furnished. It must be remembered that the roseola of syphilis resembles all other roseolas in the suddenness of its advent, and in the fact that it never, under any circumstances, develops into anything else. Its only peculiarity consists in the coppery stain which it leaves upon the skin. This, however, is shown by microscopic examination to be caused by the stasis of blood and the exudation of red blood corpuscles, and this clearly as a result of the paresis of the nerves of the blood vessels, from some impression made upon the great sympathetic nerve centres.

Long continued dilatation of the capillaries and stasis of the blood, says Baumler, are all that is necessary to produce this pigmentation. If, then, mental emotions and indigestions are recognized as capable of producing temporary roseolas, by causing a temporary paresis of the nerves of the blood capillaries, is it too much to ask you to believe that the sudden accession of degraded cell elements into a general circulation would be capable of producing a still greater impression upon the sympathetic nervous system, resulting in a more profound blood stasis, one which should leave its mark as a coppery stain ? In addition to the roseola which appears to mark the general dissemination of the degraded or syphilitic cell elements throughout the system, we find enlargement and induration of lymphatic glands at a distance from those directly connected by lymph canals with the initial lesion, and epecially prominent in the cervical and epitrochlear regions.

Those examined under the microscope show the same cell accumulation that characterized the point of original inoculation and the glands first affected, and also, as characteristic of this stage of the infection, congestion of the fauces and tonsils, which may even go on to ulceration. The lymphatic distribution in the tonsils—so extensive that it is accepted by histologists as a form of lymphatic gland—and mucous membrane of the fauces, unusually rich in lymphatic vessels, would naturally be expected to sympathize with the grave disturbance which has been shown to be going on in the general lymphatic system.

Now, although the syphilitic cell elements have been traced, in entire accord with known physiological and pathological laws, from the site of original inoculation through the lymph channels and into the general blood current, and that thus an opportunity has been afforded for the vitiated cells to find their way into the general gland system, and to the mucous surface of the pharynx and tonsils, the exact course taken by them to effect this has not yet been ascertained, the fact alone has been demonstrated.

The course of syphilitic infection towards the periphery of the body is more clear. Carried by the outgoing blood current from the centre of the circulation into the most superficial cutaneous capillaries, it finds here the blood circulation the most sluggish—a condition known to favor activity of motion and proliferation of all embryonal cells, and to aid them in wandering out of vessels and into the tissues. "Contact with tissues and relative rest of the emigrant cells," says Rindfleisch,* "induces them, first, to essay their amœboid mobility, then to division." The extreme point to which the cells may be carried, and thus the greatest degree of relative rest which they may find, will be in the capillaries of the papillæ cutis. Here, too, we find their nearest approach to the lymphatic vascular system. "The capillaries of this system," says Feichman,† "lie exactly in the centre of a papilla cutis, while the blood vessels traverse its periphery, winding up, corkscrew fashion, until they unite at its apex." "The points of union, or of curving," says Rindfleisch, "are constantly dilated. Everything indicates that a certain increase of pressure and retardation of the circulation must occur in the papillæ of the skin." Again, Wagner says, "The resistance which affects the velocity of the blood lies in friction, the velocity is greatest in the arteries, less in the veins, and least in the capillaries." Consequently, it is in this juxtaposition of the blood capillaries surrounding the papillæ cutis and the lymph capillaries passing up through their centres—that is to say, in the tissue spaces intervening between these—that we should expect to find germinal or other material escaped or exuded from the blood capillaries, detained in their natural transit into the lymph capillaries. The office of these latter being admitted, as claimed by Rindfleisch, to return to the general circulation material thus exuded in excess of the necessities of growth and repair, contact with tissue and relative rest of the exuded cells induce them first to exercise their power of independent locomotion and then of proliferation. Thus, here in the papillæ cutis we should expect accumulation of cells similar to those found at the site of the original inoculation. And this is exactly what we do find in the natural clinical history of the disease as confirmed by microscopical examination. Thus Baumler describes the syphilitic papular eruption as consisting of "well-marked circumscribed (cell) infiltrations of the papillary body of the cutis;" and he further says, "it is often impossible (microscopically) to distinguish an isolated secondary papule from a commencing primary affection." This statement is but in confirmation of that of Kohn and others, who claim the so-called secondary syphilitic papule to be located originally in the papillæ cutis alone, and composed of cells identical with those already described as characteristic of the syphilitic cell proliferation at other points; and "Further," says Kohn, "the cells which make up the body of the papule are not destined to become permanently organized, as they degenerate and disappear, undergo fatty degeneration, or they may become heaped together in the form of detritus and become pus."

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* Rindfleisch, Pathological Histology, Am. ed., p. 94.

† F. Von Recklinghausen on the Lymphatic System; Sineker's Comparative Histology, vol. i, 297. Sydenham edition.

Thus it will be seen, that, in point of time of appearance, in point of exact locality, in point of exact composition, in point of subsequent behavior, the hypothetical eruption necessitated by the introduction of the disease-germ of Beale, upon a surface of inoculation on the virile member, and carried by the lymph current through the lymph channels into the general circulation, then carried out with it to its inevitable lodgment in a papilla cutis, there proliferating under the most favorable conditions, produces, as a logical sequence, the characteristic papule known to occur in the natural course of syphilis—the so-called papular syphilide.

It will also be seen from the description of Kohn, that the pustular eruptions of this, the secondary state of syphilis, are accounted for as papules, the cell-elements of which become broken down from various causes, constitutional or local, and become pustular. Examination of the mucous patches and tubercles of this stage of syphilis under the microscope shows them to be only papules occurring upon mucous membrane, and in places upon the skin subjected to unusual moisture.

The iritis characteristic of this stage has been shown by microscopic examination to be characterized, if not caused, by the deposit of cells; and the so-called gummy tumor of the iris has been shown to be simply a papule, a mass of hastily generated cells developing in a locality, the anterior chamber of the eye, free from surrounding pressure, and thus assuming the well-known irregularly nodulated form.

The alopecia of active syphilis has been shown to be due to the deposit of cells in the tissue spaces of the hair bulbs sufficient to interfere with proper nutrition. Syphilitic onychia is found to be similarly dependent upon deposit—excessive localized cell accumulation in the nail matrix. In short every known manifestation of syphilis, in the skin, in the lymphatic vessels and glands, in the hair, in the eyes, in the nails, in the bones, has been proven beyond dispute, through competent microscopic examination, to be due to one and the self-same cause, viz., an excessive accumulation of white cell elements. Wherever a syphilitic manifestation during this, the active stage of the disease, is found, a crowd of newly proliferated cells is found to account for it, and nothing else. The simple mechanical pressure in the tissues, and in the vessels of nutrition of every affected part, is in sufficient degree to account in a rational way, not only for every possible variety of initial lesion, uncomplicated with other disease, but for every variety of constitutional manifestation ever known to occur during the active or so-called secondary period of syphilis, and this, too, in complete accord with known physiological processes, and in harmony with recognized physical laws.

The evidence which brings us inevitably to this conclusion is not simply theoretical, it is the evidence of facts which abut and uphold at every conceivable point the claim that syphilis is a disease of the cell elements of the human organism, that excessive proliferation of these elements and their localized accumulation in the various tissues is the only known direct effect of this disease, and that its influence in producing the localized lesions characteristic of syphilis is chiefly, if not wholly, mechanical. Accepting, then, such a conclusion, what suggestion does it afford in regard to the legitimate mode or modes of treatment? Evidently, the administration of antidotes, or specifics, or specific tonics, can only receive consideration while the disease is assumed to be the result of a specific virus. The existence of such a virus has never been proven, and has been assumed only on purely theoretical grounds; and even then, their administration, however beneficial to persons subjects of syphilis, until the actual discovery of the alleged virus, its real nature and composition, can never be other than empirical. What is wanting to make it scientific is, first, an exact understanding of the work to be done; secondly, an appreciation of the ways in which it may be done; and, thirdly, of the means through which it may be most directly and judiciously accomplished. It seems to me that there is no longer any occasion to ask, What is the work to be done? There can be no question as to the fact demonstrated by scores of scientific observers, that the tissues affected with syphilis in its active stage are literally groaning under a pressure of cell material manifestly in great excess of the necessities of growth and repair, and acting as foreign material in disturbing the sensation and nutrition of the affected part. It is equally well known that the complete disappearance of these superfluous cells is equivalent to recovery from syphilis. What we want to know, then, in the treatment of this disease is, not an empirical formula, but a reasonable way through which such foreign material may be removed from the system. Nature's way of getting rid of superfluous cell or tissue material is by the well-known process of tissue metamorphosis known as fatty degeneration; what Rindfleisch characterizes as "the regular mode of decomposition for many tissues liable to change." "Fatty degeneration," says Wagner, "is favored by disturbances of the cirdulation and of nutrition—new formations of every kind, especially of those formed largely of cells," etc.

Now this fully accords with what we occasionally recognize in the natural history of syphilis, viz., a tendency to get well without any treatment whatever. In certain cases nature is, without doubt, fully capable of eliminating the cell products of active syphilis; delay in effecting this, however, is recognized as resulting most frequently in sequelæ, more or less troublesome, which are ordinarily classed under the head of tertiary or late syphilitic lesions. It has, then, from the earliest times, been considered desirable to hasten the cure of syphilis by artificial means. And it is a curious and instructive fact that all the remedies or plans of treatment which have ever found even temporary favor in curing or in mitigating syphilitic disease, have been those which are recognized especially as favoring fatty degeneration. Thus the ancient sweating cure, the treatment by various decoctions and by hot baths, the starvation cure, the syphilization cure, the tartar emetic or so-called tartarization cure—pustules in the one produced by inoculation of unhealthy pus, and in the other by application of the potassio-tartrate of antimony. But throughout all time since the discovery of mercury and the iodide of potassium—agents recognized as par excellence the most effective in setting up and hastening the process of tissue metamorphosis—producing fatty degeneration and elimination of all living tissues—have held the first place, as they do to-day, in the successful management of syphilitic disease.

At times the mercurial treatment has been temporarily undervalued because the true nature of its action was misunderstood; it was given as a specific against the disease generally, or as an antidote to the syphilitic virus so called. As a matter of course, having no conception of what the virus was, or its mode of action, quantity was naturally accepted as an important factor in neutralizing this hypothetical poison and its effects, and it was often given to the extent that the effect of the drug was often found to be worse than the disease. M. Philip Ricord, of Paris, was perhaps the first, through his good sense and great clinical experience, to recognize the value of small doses of mercury, long continued, as the most successful and judicious plan of treatment, and the first to announce positively as he did in the Clinical Society of London in 1872, that syphilis by this method can be cured. Ricord's great name at once secured him many followers of this method, and some imitators.

Perhaps it was Headland, the distinguished English therapeutist, who led the way to Ricord's views, for, in curious coincidence with the views of syphilis which I have here advanced, he writes, under the head of Antiphlogistics: "Mercury has the power of producing a decomposition of the blood" . . . and in regard to its curative action in syphilis he says:* "It seems to me to be not unreasonable to suppose that mercury in its destructive action may seize first on those parts of the blood which are most diseased, or most liable to putrefaction, and that it may grapple thus immediately with the fermenting and multiplying virus of syphilis—decompose it as well as those materials of the blood on which it has commenced to feed, and eliminate these and itself together by the glandular outlets of the frame." Again, p. 185: "Mercury attacks the *plastic* element of the blood . . . produces a fetid material out of it which is rapidly eliminated." Ricord's plan was to use such a given limited quantity of the drug that the destruction and elimination of the diseased elements—the so-called virus—should go on with the least possible damage to the general system.

With the view of the cell origin of syphilis which has been presented to you—a disease made up of cells hastily generated and thus holding their grasp upon life with less tenacity than the normal structures and cell elements—we shall find of necessity the highest excellence in a treatment which shall most rapidly induce a fatty degeneration and elimination of the diseased cell elements, while falling short as far as possible of disturbing the healthy cell elements and tissues. This brings us virtually to the same practical position as that finally reached by M. Ricord, who adopted his plan, though empirically, yet as the result of sound judgment and experience. We, on the other hand, are forced to it as a logical sequence of our position in regard to the nature of the disease. We are not fettered to a medicine warranted to act as a specific, an antidote, or a tonic; it is a principle which must guide; and hence, when we meet with an agent that is demonstrated as of greater power in inducing tissue metamorphosis than mercury or the iodide of potassium, or which will better aid us in the elimination of the products of that metamorphosis, then we shall philosophically be bound to make the change. We may also legitimately aid the treatment by any other means which are of known value in producing the same variety of tissue change; and especially shall we find our knowledge of a governing principle of value in the management of syphilis when on account of condition or idiosyncrasy the system of the patient is found to be wholly intolerant of the use of mercury and the iodide of potassium.

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* *Headland* on the Action of Medicines, Eng. ed., p. 202.

What I desire now to make especially prominent is the fact that the course of syphilis, from its inception to its close, is entirely in accord with well-established physiological laws, and that the known facts which go to prove this are joined together by links of evidence, circumstantial and presumptive, of such completeness, that a continuous line of march may be traced, starting from the deposit of the disease germ of syphilis at the point of original inoculation, and followed by its recognized and legitimate influence through all the subsequent manifestations of the disease to its final exodus through fatty degeneration at the close of its course. I desire further to call attention to the fact that the virus of syphilis, in this view of the case, is simply an influence, and not a physical entity; and that this influence is inherent in all cells, whether healthy or degraded.

Rindfleisch,[*] in speaking of the formation of the epithelial structures, says that "An embryonal formative cell can only then become an epithelial cell when it comes into contact with such. We must believe in a kind of epithelial infection;" and, further, he says, " this must of course just as well obtain where embryonal formation cells, colorless blood-corpuscles, approach an epithelial stratum, as when, conversely, epithelial elements approach embryonal formative cells."

Here, then, we have a contagious element, an infectious principle claimed to exist, in the normal, the healthy development of tissue. Shall we then, because the self-same influence is shown to manifest itself in a diseased condition of the cells, insist that a separate influence, a mysterious and invisible, possibly a tangible virus must have been developed to account for it, and then go on to fight this virus with antidotes and specifics?

Is it a sufficient answer to claim that clinical experience has shown the value of mercury and the iodide of potassium in the treatment of syphilis, that these remedies have been successfully administered as antidotes and specifics and tonics, and that hence antidotes and tonics and specifics they must be? Is it not now time to cease fighting this ever-present bugbear of a virus, when it is proven that the real foe is a tangible, demonstrable material, subject to the same conditions which characterize other physiological and pathological materials and processes?

Is it objected to this view, that the same medicines and measures are made use of which experience has shown most successful and judicious in the management and cure of syphilis, and that, if the same or similar results are obtained, the principle on which the administration of remedies is based is not important? In reply, I would claim that it is just this principle which is important; even though, under the pretence of antidoting a virus, or counteracting it by means of a specific or a tonic, we do actually destroy or aid nature in destroying and eliminating the degraded cell elements which constitute the only known evidences of the disease. It is just this principle which constitutes the difference between empiricism and sound medical science.

The treatment of all cases of syphilis during the acute stage (including what is usually described as the primary and secondary periods of syphilis) will be addressed to the removal of the material which is causing the trouble, that is, to the superfluous cell-growths or accumulation, the same material that we find in the initial lesion. and the same as that which we find embarrassing and enlarging the gland structure, the same as in the papule, the same as in the mucous patch, and the same as in the papules which form the scabs which occur on the scalp. These lesions are all brought about and kept up by one and a single condition, namely, that resulting from an abnormal local proliferation and accumulation of germinal cells. This fact has been substantiated by repeated microscopical examinations of all lesions of acute syphilis. Consequently, the cause of all the several conditions or lesions of active syphilis being the same—that is to say, an accumulation of this embarrassing cell material,—the treatment is simple, and the same for all, having simply for its object the removal of such material.

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[*] Pathological Histology, Am. ed., 1871, page 100, ¶ 83.

The question as to how this shall best be effected leads us to consider first the nature of the material we desire to be rid of. This has been proven beyond a question to consist of human germinal cells, in no known respect different from normal germinal-cells, except that they are the product of a proliferation more rapid than that process under normal conditions. Microscopically they cannot be distinguished from the cells which are proliferated and accumulated to repair loss of normal tissue brought about by ordinary causes. Secondly, What are the means and processes by which healthy cell-material, exuded in excess of the necessities of growth and repair is removed? The answer is simply that the necessary process is a fatty metamorphosis, through which alone every living material, normal or abnormal, must pass before it can be eliminated from the living organism. The means by which it may be effected are various: 1st, pressure; second, innutrition; 3d, various external agents and internal remedies, which by experience have been found efficient in producing or hastening fatty degeneration or metamorphosis of tissue.

First, in regard to pressure: The effect of pressure in producing this result is recognized in its known influence as a surgical measure in reducing and dispersing abnormal growths. This is also recognized in the tendency to spontaneous disappearance, after a time, without treatment, of the cell accumulations of syphilis. The tendency of all syphilitic lesions is toward recovery. The necessary pressure exerted upon any local cell accumulation in the tissues would tend toward its removal by fatty degeneration.

Second, in regard to innutrition: Withholding of necessary food produces fatty degeneration of the tissues. The starvation cure was at one time, especially in Germany, in great repute as a cure for syphilis. The sweating cure. The long popular and much vaunted cure by cathartics, diuretics, etc., through profuse drinking of decoctions of sarsaparilla, senna, and different woods, can now be recognized as influential through their capacity to hasten fatty metamorphosis. But the remedy of greatest acknowledged value in the treatment and cure of syphilis for the past two hundred years, and up to the present day, is mercury, and this it is well known is also the most efficient agent in producing fatty metamorphosis of living material. Healthy persons quickly emaciate, all kinds of tissues break down, under its continuous excessive use. In the salivation it then produces, the characteristic fœtid odor has been found due to the decomposed fat which results from the fatty degeneration it causes. In point of fact, every remedy which has ever had a substantial reputation as of value in the treatment of syphilis will be recognized *a priori* as one of greater or less power in inducing fatty metamorphosis. If then we find in syphilis, as the characteristic and essential factor of every lesion, an accumulation of superfluous cell material, sufficient in degree to embarrass the functions of the vessels or tissues implicated, we have good reason to introduce the remedy which *par excellence* is known to be potent in removing *it, namely, mercury*. And if we consider that this remedy is also in highest repute from a clinical standpoint, we are warranted in its administration with the expectation of the best possible results. The manner of its use, the size of the dose, its frequency, and time of continuance, only remain to be settled. Clinical experience in the administration of mercury has taught the fact, now accepted by all recent recognized authorities in matters syphilitic, that small doses of mercury continued for a very long period, say from one to three years, constitute the best treatment for the most efficient and permanent eradication of syphilis from the system of a person afflicted with that disease, and that this applies to any and every form and manifestation of it during the acute stage, which stage may be said to cover a period varying in different cases from one to three years. The hastily generated cell material which has been described as the essential element in the production of the different manifestations of syphilis lacks the healthful vitality to enter effectively into the composition of normal tissues. It is present only as obstructive material, and from its presence as such is already subjected to the mechanical influences which tend toward its dissolution. It may then be accepted as more readily affected by remedial measures calculated to induce fatty metamorphosis of living material than such material generated and developed under normal conditions. Hence, a smaller amount of mercury, for instance, would be necessary to effect its removal from the affected organism than would be required to produce a like effect on healthy tissues. Such an amount then as would cause the speediest removal of the imperfect or syphilitic material, without damaging the healthy constituents of the body, would constitute the highest ideal of an anti-syphilitic treatment. Hence, we can accept from an intelligent and philosophical standpoint the position which has heretofore been only taken from a clinical or empirical view of the matter, viz., That small doses of mercury long continued constitute the most effective and judicious mode of treatment of syphilis during its active stage.

Beginning then with small doses, of whatever preparation of mercury we decide to administer, in a given case, we increase the amount until we find the constitution of the patient being affected, evidenced by the presence of softness of the gums or a little red line about them. When that occurs, we know we are getting to a point of affecting the healthy structures of the body, and then the dose is reduced until just that point is reached at which the patient can be carried through without any disturbance of the bowels or of the salivary apparatus. We should commence by giving small doses of mercury, gradually increasing the quantity until the point of tolerance is reached, and keep it there. Any of the preparations of mercury may be given. We will begin, say, with the proto-iodide, a quarter of a grain, three times a day, for two or three days, or, lest the patient should, as is the case with some, be peculiarly sensitive to the influence of mercury, we may begin by giving only two pills a day, for two or three days, and then add a pill at a time as long as he shows no evidence of disturbance from it, and, when the highest point of tolerance is reached, continue the dose. Sometimes blue mass with iron is used, pills containing two grains of the mass hydrarg. with one grain of the exsiccated sulphate of iron—two to four daily until the desired impression is produced, and continuing, usually, about three per day throughout the desired period. In all these cases I may remark that iron is indicated because the health is usually more or less below par. Therefore, when giving the proto-iodide of mercury, I am also in the habit of giving the dialyzed iron, in doses of ten or fifteen drops, three times a day. The biniodide of mercury may be given in doses of a sixteenth of a grain, or any other of the preparations of mercury may be administered in suitable doses, the object being simply to get the gradual and positive effects of the drug. It may be administered by external means, using a small quantity of mild mercurial ointment, say the size of a filbert, rubbing it in under one knee one night, under the other knee the next morning, under the axilla the next night, and so on, using it night and morning. There have been those advocating the hypodermic use of a solution of the bichloride of mercury, but this is a method of administering it which, while I have used it, I do so no longer, and do not recommend it, finding other quite as efficient and more agreeable ways of introducing mercury into the system. Mercurial baths or fumigations may also be used for the same purpose.

Whatever be the form of mercurial you decide upon employing, your treatment should be conducted according to the principles I have mentioned for all the lesions or manifestations of the acute stage of the disease, whether it be of the skin, of the mucous membrane, or whether it be a syphilitic iritis, an inflammation of the iris (which is caused really by a papule occurring at that point, that is, an accumulation or aggregation of cells). All these conditions or manifestations of syphilis, I repeat, respond to this systematic method of mercurial treatment better than to any other. The open lesions during the acute stage of syphilis, chiefly on mucous membrane, the mucous papules, patches, and tubercles, before alluded to, in addition to constitutional measures, require prompt local treatment, especially on account of the contagious property of their secretion. Daily applications of a strong solution of nitrate of silver—forty to sixty grains to the ounce of water—or a light brushing over with the solid arg. nit. will be found most efficacious in hastening their disappearance. This also applies to ulcerations of the tonsils, which sometimes occur during this stage.

When papules are so situated as to cause annoyance by their unsightliness, as on the face or hands, ung. hyd. præcip. alb. with an equal quantity of cosmoline, or a ten per cent. solution of oleate of mercury with equal part of cosmoline may be used as a daily local application with advantage—in the latter case a few drops of one of the essential oils will render it more agreeable. The diet of the patient should be simple, excluding acids, spices, and highly spiced food. Tobacco is particularly injurious during the course of this disease, from the fact that both smoking ing and chewing are liable to produce irritation of the mucous membrane, and when a mucous patch occurs in the mouth it is a very difficult thing to heal while its contact with tobacco is kept up. It is certainly a very great hardship for persons who are addicted to the use of tobacco to give it up; but it is very important that they should do so for the proper and effectual treatment of this disease.

You should bear in mind that the secretions of all lesions during this stage of the disease are inoculable, and one suffering from it may communicate the disease from the secretion of any open lesion upon his body or on the mucous membranes. You will understand, therefore, the importance of warning the patient having such lesion of the danger of communicating the disease to others by contact. A pencil, a pipe, a spoon, a knife or other article introduced into the mouth where mucous patches are present, some of this secretion contained in the saliva drying upon it, and afterward coming in contact with an abrasion of the lips of another person, will communicate syphilis to that person as positively and certainly as would a syphilitic venereal connection. From this you may see that syphilis is not necessarily a venereal disease, but any one exposed in the ways above referred to is liable to receive it, in which event it will follow the same course as if acquired by venereal connection. The great security which we have against the accidental acquirement of syphilis is, that it requires an artificial port of entrance—a fracture of the skin, or of the mucous membrane for its inoculation. Otherwise, sooner or later, we should all be likely to have it, for we could not come in contact with people who have syphilis without danger of getting it at every turn. But, fortunately, it requires an abrasion for its entry, it is rarely through the ordinary affectionate relations between children and parents, brother and sisters that communication of the disease takes place. If, however, an abrasion exist upon the lips of both parties, the disease may be communicated from the one to the other by a kiss. I have often known this to occur in the venereal kiss, but never by the ordinary kiss of courtesy and family affection. But the liability to communicate the poison to an innocent person should be borne in mind by every one passing through the acute stage of syphilis. We must also bear in mind the fact that the disease may be transferred from a syphilitic to an innocent person by the physician, by the use of the spatula, carelessly laying it down after examining a syphilitic mouth, allowing the secretions to dry upon it, then introducing it into the mouth of another patient before properly cleansing it. This is especially liable to occur if the second patient be a child, as by its restlessness during the examination a lesion of the mucous membrane of the mouth may be made by the instrument. All instruments in use about the mouth, throat, or teeth should be carefully cleansed and passed through the flame of an alcohol lamp immediately after use, and certainly before use upon another person, because syphilitic lesions may be present, although unrecognized. Several well-authenticated cases have come under my observation where syphilis has been contracted in the mouth from lack of proper care in this regard. Mucous papules are very often present in the vagina or on the os uteri of females suffering with acute syphilis. In the *Independent Practitioner*, for March of 1882, may be found a report of no less than eight cases of syphilis of the finger, in medical men, acquired through vaginal examinations or attendance on syphilitic women during childbirth; and since sending in that report I have seen two similar cases, occurring in the resident medical staff of one of the hospitals of this city. All of these cases were followed by constitutional evidences of syphilis. It is scarcely necessary to say that the early recognition and local treatment of mucous papules, patches, or tubercles, is one of the important duties attaching to the management of acute syphilis. Another characteristic lesion of the disease consists in the presence of scabs in the hair. The discovery of scabs in this locality sometimes enables us to make a positive diagnosis, when otherwise we would be in doubt. Falling of the hair, or alopecia, is one of the common, though not constant, concomitants of this stage of the disease, and it is readily accounted for on the same principle that explains the exfoliation of the epidermis in the syphilitic papules. The crowding of newly formed cells in the vicinity of the hair-bulbs interterferes with their nutrition. It is not at all unusual for a patient to lose his hair completely, including his eyebrows and whiskers, but this baldness is not permanent, since on proper treatment, directed to the removal of this superfluous cell material, the hair is renewed. We find that any or all of the foregoing lesions of syphilis may be absent and the patient yet go through a disease which shall be recognized as syphilis. In other words, this disease varies in its intensity as much as any other, and except the enlargement of the lymphatic glands one of the conditions above referred to are necessarily essential to the progress of syphilis.

The length of time usually required for the complete cure of syphilis will vary in different individuals from one to three years, and during all this time the patient should be under judicious treatment, in accordance with the principles laid down in the case just represented. The steady, gentle influence of the mercurial is required until all abnormal cell-accumulations dependent upon the syphilitic influence have disappeared. When all external evidences of the disease have passed away and the lymphatic glands can no longer be felt, or have returned to the condition in which they were found previous to the constitutional stage of the disease, the treatment may be discontinued, but not before, unless there is some idiosyncrasy in the patient which contra-indicates its use. If the patients are faithful, sensible, and obedient, in by far the largest majority of cases they will pass through the trouble easily and happily to a complete cure. A great weight of experience in the plan of treatment which I have indicated, including that of the most distinguished authorities in Europe and America, assures us of the truth of this, and that patients do not suffer from the long-continued treatment in any appreciable way, and, further, that in consequence of it they have the greatest and the only security of escape from the so-called tertiary, or late lesions—the sequelæ of syphilis.

I am quite well aware that there is a great popular prejudice against the use of mercury in syphilis, and this has arisen in great measure from the abuse of the drug in earlier times, but it has been kept up and intensified by quacks, and the ignorant and the unworthy of our profession, who, from causes and motives natural to these classes, refuse to accept the testimony of the learned and experienced authorities who are now in complete accord in this matter in every part of the world. Without a show of evidence or experience entitled to respect, they deny the necessity of the mercurial treatment, and make the pretence that syphilis may be as efficiently and more safely managed without it. They point to cases thus treated apparently well of the disease, and claim them as evidences of the truth of their statements. The very important fact that syphilis, in its acute period, is a self-limited disease, and will pass away with any sort of treatment; or without treatment, is not made apparent. This is the fact, and while we claim and know that a judicious mercurial treatment will hasten the cure of the active lesions and stages of syphilis, it is not on this account that the treatment is considered essential. It is because, more than any other known remedy, it prevents the sequelæ of syphilis—the so-called tertiary lesions—which result in destruction of important tissues and organs, vessels and bones. These accidents do not occur in the early or active stages of syphilis. After the apparent disappearance of syphilis in a few months or a year or so, there comes a deceitful period of perfect health, perhaps. The disease is indeed cured; but in two or three, or ten, or twenty years after, new troubles may arise, no longer contagious as in the past syphilis, but destructive. It is this that causes the really important damage. Deformity, disability of body or brain, or both, and, finally, in some cases, death. It is to avoid the danger, present in every case of syphilis, of such results, that the persistent and judicious use of mercury during the acute period of the disease is most important, and is, as we fully believe and know, absolutely essential. We do not urge the administration of mercurials without a due consideration of the responsibility we take in so doing, without a knowledge of all it has ever done that is objectionable, or ever may do; it is that because without a systematic, judicious mercurial course the patient who has once been a subject of syphilis, in no matter how light a form or how slight or short-lived the manifestation, is in jeopardy every hour, and that nothing but a course of simple mercurial treatment, continued systematically for at least a year, can afford any reliable security. This is the experience of all in our profession who have any title to a respectful hearing, on account of wisdom and experience, and in the present state of our knowledge of this matter it is sufficient to warrant you in insisting upon the necessity of such a course of treatment in every case of syphilis which in the future may present to you for care and treatment.

Do not understand me to say that every case shall be treated in the same manner as to the size of the dose or the mode of administration, and without regard to the physical condition and circumstances. A judicious following of the plan insisted on is necessary—such an amount and such a mode of administration as may be borne without disturbing the digestive apparatus, or materially interfering with the processes of nutrition. As a rule, if the medicine is judiciously administered, the patient will not only not be disturbed, but he will improve in both these respects. How much a more regular and exemplary mode of life with a proper management of syphilis necessitates, has to do with the improved condition, I am not able exactly to state, but it is nevertheless a fact, that most young men are in better health after a judicious course of specific treatment for syphilis than before its acquirement.

I do not wish to be understood that no other medicines are necessary or advisable in any cases of active syphilis. There are idiosyncrasies that must be respected—cases that will not bear the ordinary amount of mercurial without trouble of some sort. These are fortunately rare, but when they present, you must use your ingenuity so to reduce and combine your most excellent remedy that it may be borne. You may alternate it with the iodide of potassium, which is also an agent of much value in bringing about fatty degeneration of living tissue, or you may, if you can do no better, rely upon this drug in combination with other means and measures which are known to favor fatty degeneration and elimination.

You may meet with cases that will try your temper and your courage—that will call into fullest requisition all your knowledge and your experience and your judgment and, not least, all you common sense, and yet fail to obtain such a toleration of the mercurial as will enable you to prevent the occurrence of the sequelæ of syphilis. These cases will, however, I am glad to say to you, be rare exceptions, and you may have the assurance of the rule, that such a plan of treatment as I have sketched out for you will be well borne, and will not alone aid.you in carrying your patient with comparative equanimity and comfort through the active stages of this disease, but, what is of infinitely greater importance, you will give him the greatest possible security against an occurrence of the sequelæ or manifestations of so-called chronic or tertiary syphilis.

SYPHILIS, THE SEQUELÆ OF.—*Syn.: Chronic or Late Syphilis, Tertiary and Quarternary Syphilis.*—In following the natural history of syphilis, as portrayed in the preceding pages, it will be seen that wherever the syphilitic influence is recognized at a given point, culminating in a well marked manifestation of syphilis—this on microscopic examination has been found to differ from the healthy surrounding structures only by an excessive local proliferation and accumulation of cells in no way distinguishable from normal germanal cells ;—and, further, that this local proliferation and accumulation is favored by anatomical conditions, in localities long recognized, clinically, as the favorite seat of such manifestations.

The active period of syphilis, thus shown to be marked by excessive localized cell proliferation, was shown to be equally characterized by the contagious property attaching to cells thus generated. Inoculation of the blood, and of the secretion of all open lesions during the active period of syphilis, has been found capable of communicating syphilis promptly to healthy persons.

The physiological secretions—milk, saliva, urine, perspiration, tears, and spermatozoa—have not been proven to be agents of syphilitic infection. Where apparently so, in many cases, syphilitic lesions of the mouth or breast have been found, to account for the seeming inoculability of the saliva or of the milk. Repeated experiments * have been made by inoculation of the spermatic fluid of a person proven to be in tne active stage of syphilis, upon healthy persons, with absolutely negative results. In this we find confirmation of our position that the contagious property of syphilis is not an entity, an independent virus, pervading all the tissues and fluids of the organism, but that it is confined to the white blood or tissue-building cells, and, in this view, we readily see how the physiological secretions above mentioned, which do not contain them, are found also to be free from the contagious property of syphilis.

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* Dr. Mireur, of Marseilles. Annales de Dermatologie et de Syphilographie, No. 6, Tome viii, 1877.

Thus far the only distinguishing feature which has been recognized between normal embryonal cells and cells which make up the accumulations characteristic of the active stage of syphilis is the possession, by the latter, of the contagious property; in other words, a contagium,—the power of setting up in other cells, through simple contact, the same disposition to rapid proliferation which the so-called syphilitic cells are known to possess. The direct result of this hasty proliferation, as far as we have yet been able to discover, is not a destructive action. It is simply and only what we should naturally expect from hastily generated normal material in excess of the necessities of growth and repair. In representative, uncomplicated cases it remains for a time obstructing the tissues by its presence, and then through purely normal processes, often of necessity set into operation by crowding of the newly-formed cells, prolonged pressure, and consequent innutrition, and also, from general causes, it undergoes fatty degeneration, and is in this way finally eliminated from the affected organism.[*]

Bäumler virtually supports this view[†] when he says of the active stage of syphilis, "If there are only a few local deposits, the elimination of the virus may be so much in excess of its production that the organism is gradually freed from it. This takes place in the majority of cases, and at the expiration of eighteen months, or two years, the infection is entirely exhausted."

Mr. Hutchinson, of London, in speaking of the contagious property which attaches to the emasculated white blood cell, which we call pus, says, "All living pus is contagious. . . . . I mean," he further says, "that all pus cells possess the power of setting up, when transferred to another home, if that home be a suitable one, a kind of inflammatory action similar to that from whence they themselves had originated."[‡] This, we know, results in the almost immediate death of cells in localities so contaminated. In the case of the germinal cells contaminated by contact with the syphilitic cells, however, this results only in a hasty genesis of cells, a too rapid production, which prevents their highest development; they fall by the way, are heaped up, undergo fatty degeneration, and are, or may be, eliminated. Nor is it alone in diseased cells that a contagious property is claimed to reside. We have distinguished authority for saying that, in the normal development of epithelial structures, the property of contagion, is an essential feature.[§] (See page 19 copy). If this be true, it at once becomes evident that the contagious property is not of necessity a virus; and it must, I think, be suggested, in this view of the matter, as equally evident, that the so-called virus of syphilis is simply a manifestation of that property, or personal influence, inherent in all cells, whether healthy or degraded, and which is as subtle and intangible,—as incapable of material demonstration, as the influence which one mind exerts over another. Is it not then possible that the mischief which syphilis does is rather the result of an interference with the normal processes, through nasty development brought about by this influence, than of the action of a specific virus ?

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[*] A fatty metamorphosis, entirely like that which occurs pathologically, occurs in the normal condition of the organism. Wagner page 305.

[†] Page 247 of Ziemssen's Cyclopædia, Am. ed., vol. iii.

[‡] London Lancet, September 18, 1875, page 409

[§] *Text-Book of Pathological* Histology, Rindfleisch, Am. ed., 1871, page 100, § 83.

In any event this contagious property of syphilis ceases with the active period of the disease. After this has passed, the secretions of open lesions, and the blood, no longer contaminate. It may also be said that, in by far the greater number of subjects of syphilis (and more especially those who have been systematically and judiciously treated), they remain free from any farther sign of the disease. If this be so, then we may legitimately claim that, at the termination of the active period of syphilis, just described, all subsequent troubles must be looked upon as sequelæ, and not as a stage of syphilis, any more than we should look upon dropsy as a stage of scarlet fever, or stricture as a stage of gonorrhœa. Mr. Hutchinson, who is recognized as one of the most advanced of the English authorities on syphilis, says : "What are called tertiary symptoms do not constitute a necessary stage, and are rather to be regarded in the light of sequelæ, which may or may not show themselves."* Mr. Henry Lee (also a valued authority), in his Hunterian Lectures delivered at the Royal College of Surgeons of England in 1875, presents the same view of so-called tertiary or late syphilis thus: "The pathological changes in this class occasionally, according to Mr. Lane's view, present themselves in patients who have passed through the primary and secondary stages of syphilis, but in whom the venereal poison no longer exists, and therefore cannot be transmitted."

This is, I know, quite at variance with the usual teaching in this matter The accidents following upon the active period of syphilis areusually. reprepresented, not as sequelæ, but as the direct result of the syphilitic virus, which had never been completely eliminated, but had remained in the system in a latent state. Authorities are quite agreed, however, in regard to the clinical fact that, after a varying interval of from one to forty or fifty years from the acquirement of syphilis, a new variety of lesions appears in certain cases.

These are often characteristic although widely different in locality, appearance and results. Occurring only in a small proportion of the subjects of active syphilis, they are thus shown not to constitute essential stage of the disease, but the accident of it. Thus the so-called tubercular eruption, like the papular eruption of acute syphilis in some respects, and often mistaken for it, but differing, 1st, in that it never occurs in six months and rarely under a year from the acquirement of the initial lesion ; 2d, it is not symmetrical and generally distributed, but in patches, or groups, or single tubercles ; 3d, of deeper color, it is also more elevated—more juicy in appearance ; 4th, while frequently ulcerating (and often extensively), it not unfrequently passes off without ulceration, and yet leaving well marked cicatricial depressions on its site. This latter is the chief diagnostic point, independent of history or other associated lesion. It is known as the tubercular eruption of syphilis. In other cases, under apparently the same conditions, an eruption sero-pustular in character may occur, the eruptive points varying from three to six or more millimetres in diameter, often sparsely scattered over the entire body, which soon become covered with thick yellow laminated incrustations, and these when removed discover only superficial loss of integument. This is known as the Syphilitic Ecthyma. And again, in still other individuals, one or many red spots may appear, which soon vesiculate and become covered with a dark sienna colored scab, which accumulates in layers, and increasing in size, may reach even an inch or more in diameter, upon the removal of which sharply cut loss of tissue, will be seen, not seldom, involving the entire thickness of the integument. This is termed by Anthon the Syphilitic Rupia. Examination of all these lesions fails to discover any specific material or element in their composition; the microscope shows chiefly serum, lymph and pus cells, blood and epithelial debris. A depreciated condition of the general system is always the precursor of such symptoms, especially marked in the rupetic variety. And yet again, eruptions may occur presenting appearances similar to simple lepra, or psoriasis, or eczema, oftentimes so nearly identical in appearance that only the test of treatment enables even the expert dermatologist to decide as to whether the disease is of simple or of syphilitic origin. Underneath the integument tumors sometimes occur, varying in size from a pea to a pullet's egg; in the cellular tissue, or in the substance of the muscular structures. Often painless, seldom suppurating, except when subjected to prolonged and habitual pressure, often disappearing spontaneously and readily responding to suitable treatment. Tumors in the bones, called syphilitic nodes, are also possible, occurring like the previously described lesions of the cutaneous, cellular and muscular structures at any time after a year or more from the occurrence of acute syphilis, and up to the latest years of life; painless or painful according as the periosteum is more or less rapidly distended or pressed upon by overlying tissues. Chiefly occurring on the anterior surface of the long bones, especially of the tibiæ, and on the external tables of the skull, occasionally involving the internal table and the diploe, and in such case sometimes disappearing spontaneously without involving the scalp, and without a trace of necrosis, but leaving distinct evidences of loss of bony substance through the influence of pressure by the material cause, the tumor. Similar tumors of bone may occur at any point throughout the bony system, producing disturbance by pressure on important structures.

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* London Lancet, page 88, January 17, 1874.

Tumors in the various organs of the body, occurring apparently from similar causes, and in the same irregular way in point of time and involving in order of frequency as follows: Testes, liver, kidneys, brain, lungs, heart, etc. In some cases walls of blood-vessels are found infiltrated with the same material of which the tumors of syphilitic origin are found to be composed, and become obstructed in the brain, often causing fatty degeneration of the structures to which they are distributed. In some cases cicatricial bands are found to develop in organs the subject of syphilitic tumors and by contraction and consequent constriction destroy the secreting structures—notably seen in the liver and testes of subjects suffering from the later effects of the syphilitic influence in these organs. It will thus be seen that the diseased conditions enumerated as characteristic of chronic syphilis—(the tertiary and quarternary syphilis of Lancereaux and other authors)—are essentially different from true or acute syphilis in date of appearance, mode and locality of development, and in the entire absence of the contagious syphilitic element. Microscopic examinations have brought to light the very important and interesting fact that all the various sequelæ of syphilis are characterized by the presence of a peculiar material, which, from its physical properties, has received the name of "gummy material." This material has been proven, by repeated and exhaustive microscopical examinations, to be made up of gelatinous fluid containing normal cells and nuclei which do not differ in the least demonstrable degree from the white blood cells and nuclei of a healthy person. Wagner, perhaps the most recent standard authority, says of this gummous material (which he terms syphiloma): "Microscopically syphiloma consists of cells, or nuclei, or both at the same time, so that sometimes the former, sometimes the latter, exceed in number. Young syphilomata, as well as the peripheral parts of the older ones, contain for the most part only nuclei, or nuclei and isolated cells; the older syphilomata, not yet very atrophic, consists for the most part only of cells, or of cells with few nuclei. The nuclei offer nothing characteristic. They are from 0.01 to

0.02 mm., large, round or rounded, or somewhat angular, and contain for the most part a distinct nucleolus. The cells resemble most uninucleate colorless blood corpuscles ; their size varies, however, sometimes between 0.01 and 0.03 mm.; some are even still larger."[*] Again Wagner (page 436) says : "The influence of syphiloma on the organism depends upon the fact that the affected portions of the membrane and parenchymata are more or less incapable of function ; partly on the deposit of cells, and especially of nuclei, upon compression or secondary atrophy of the gland cells, nerve fibres, ganglion cells," etc.

Bäumler, who fully adopts Wagner's views, says : "From the fact of the close resemblance of the cells which pervade the tissues, or occur in the form of young tissue growths, with the blood corpuscles, it is evident that, however much they (authors) may characterize syphilitic new formations, they wholly lack specific microscopic characters." He also says : "Tumors of this sort (gummy), varying in consistency, may develop in any organ in consequence of syphilis, but their favorite seats are in the subcutaneous cellular tissue, the skin, in and upon the bones, the liver, the testicles, the brain, the kidneys, and, especially in children, the lungs. According to Wagner's description," he further says, "they present the appearance of a grayish-red, soft, homogenous mass, either without fluid contents or else yielding a scanty juicy-like mucus. They may occur as infiltrations of microscopic size scattered throughout the parenchyma of an organ ; and even when they appear as sizable tumors, as large as a walnut or larger, they are not encysted nor sharply defined. but merge directly into the surrounding tissue." "The effects of a gummy tumor," says Bäumler, "may extend to a great distance in case it has caused contraction of the calibre of some vessel, especially of a blood-vessel, which is particularly liable to occur when the tumor has its seat in the adventitia of a vessel. Fatty degeneration and wide-spread processes of softening may be the consequences of a tumor in itself insignificant, as occasionally happens in the brain. When situated in the skin, in the subcutaneous cellular tissue, upon mucous membranes and superficial bones, the gumma often makes its way to the surface, since in these situations it is not uniformly inclosed on all sides, but is exposed to unequal pressure. The entire infiltration then ulcerates." It is reasonable to conclude, from the foregoing views, that contraction of vessels often plays an important part in causing the lesions of so-called tertiary syphilis ; a purely mechanical matter quite independent of the influence of any virus. In passing, I desire also to call your attention to the statement of Baumler, that "gumma often makes its way to the surface." I hope to be able, subsequently, to show how this occurs, not making its way, but progressing by natural forces in line of the natural physiological channels.

Ricord claims that tertiary lesions are not inoculable, and cannot be transmitted by hereditary descent. Bumstead states, in his last edition, after reviewing this matter, "Hence we consider the blood and the secretions in tertiary syphilis innocuous."[†] "Diday performed inoculations with the blood of persons in the tertiary stage of syphilis, and invariably with a negative result. Von Barensprung states that from observation as well as experiment he is persuaded that so soon as the syphilis has passed into the destructive forms of its tertiary stage, it ceases to generate an inoculable virus," and, says Baumler, "clinical observation seems to confirm this view, both in respect to direct contagion and with reference to the inheritance of the disease."[‡]

These authorities, together with Lee, Hutchinson, Lancereaux, and many others of our best clinical and scientific observers, thus agree fully on this very important important point. What then, is there to show that the co-called "period of gummy products" (Lancereaux) is not simply a period of sequelæ, when they are found, practically, by competent observers, to be free from the contagious property, and when by scientlfic investigators it is shown that they are capable of producing, without a virus, all the lesions without exception, which ever occur in the so-called tertiary or gummy stage of syphilis?—producing them, too, simply by interference with function of vessels and organs, not improbably through pressure occasioned by the presence of abnormal or excessive accumulations of material, which the most experienced and learned microscopists cannot distinguish from the normal elements of new formations.

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[*] Wagner's Manual of General Pathology, Am. ed., 1876, page 435.

[†] Venereal Diseases, Bumstead and Taylor, page 448.

[‡] Ziemssen's Cyclopædia, Am. ed., iii. 57.

If then we accept the lesions of the so-called tertiary stage (or the period of gummy products of Lancereaux) as sequelæ, where shall we look for the causes of the possible accumulations of normal germinal material at every point in the human organism? Naturally, it appears to me, in interferences with the lymphatic circulation the natural channels, through which, according to Rindfleisch, the nutritive material exuded into the tissues, in excess of the necessities of growth and repair, is returned to the general circulation.*

According to the same distinguished authority,† "Luxurious new formations, catarrhs, and surface serections of all kinds must be produced when the lymph conveyance is hindered, and" he further says, "we will find this position in pathology very frequently confirmed." One thing is now admitted by all recent accepted authorities, namely, that all the surface secretions and new formations of the tertiary or gummy period, all the infiltrations and tumors, all the peccant elements which produce the varied lesions in the skin, in the cellular tissue, in the bones, in the viscera, by whatever name characterized, are but the various forms of infiltration or deposit of gummy material; and if this is, as it would appear by the results of scientific investigation to be nothing more nor less than normal germinal elements thus retained at various points, then the only legitimate way of accounting for this retention would appear to be through obstructions, "hindrances to the lymph conveyance," which Rendfleisch insists, is of itself sufficient, independently of any question of syphilis, to produce just such results as are known to occur in the so-called tertiary stage or period of gummy products.

And yet another circumstance would favor this view; clinical experience has shown conclusively that whatever the form or locality or name of a lesion, whether in the skin as a scaling eruption, or as a tubercular eruption, or as a heaping up of gummous exudation in scabs, with or without ulceration, or as an ulcerative loss of tissue, or whether as a gummy tumor in the cellular tissue, in the bones, in the viscera, or in the brain and nervous system, one and the same treatment is adopted and found most efficacious and judicious for all, namely, the administration of mercury and the iodide of potassium. I have not heretofore objected to the term gummy period (so called only from the similarity of its products to the viscid material which it was believed to resemble), nor to the term tertiary, which is a purely arbitrary one; but it appears to me that we may now venture to substitute for these, the period of lymphatic obstruction, as more scientific because expressing the localization of lymphatic elements which is proven to occur, and as suggesting the lymphatic canal system as among the possible causes of that localization. It appears to me that, inasmuch as it has been shown that the lymphatic spaces and vessels are primarily and chiefly affected and obstructed during the active stage of syphilis, it is not unreasonable to infer that damage might have occurred to those spaces and vessels during the active period of syphilis, which, if properly investigated, would lead to the true explanation of the failure of that system to return to the general circulation the germinal material exuded or developed in the tissues, in excess of the necessities of growth and repair, such as is practically demonstrated to have secured in the so-called tertiary or gummy period of syphilis. There are various known facts and analogies which afford strong presumptive and circumstancial evidences that this view is the correct one. Among these we have, first, the fact, generally recognized that the more severe and prolonged the secondary or active stage of syphilis the more certain and severe are the so-called tertiary or gummous manifestations.* Second, the results of treatment show that the difficulty is not simply an aggregation or infiltration of material, which, when removed, restores the patient permanently, but that the conditions for its reproduction remain, and relapses occur.

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* Rindfleisch, Pathological History, Am. ed., 1871, page 92.

† *Ibid., page 93.*

Thus the iodide of potassium is recognized as capable of most rapidly removing the gummous material,and thus of relieving symptoms;but mercury is found requisite to produce permanent immunity. The iodide of potassium acts readily in removing recent new formations and cell accumulations, probably through the iodine it contains. The fucus vesiculosus, a remedy in use for obesity, and popularly known as "antifat," owes its virtues to the same ingredient. But mercury is known not only to hasten dissolution and elimination of fatty matters and new formations; it is besides, the only agent with which we can expect to disintegrate more or less long-standing fibrous obstructions.

In the gummy accumulations of so-called tertiary syphilis, we are obliged to infer that some condition remains, after the removal of this material, which predisposes to, or causes, subsequent reaccumulation. What is more likely, than that such condition consists in obstruction of lymphatic vessels, the office of which is to carry just such material as we find producing the difficulty; vessels, too, that have been, more than any other structures, involved in recognized troubles during the active stage of the disease? More or less inflammatory action, usually of a very low grade, is recognized at different superficial points in the lymphatic system during this period. The well-known tendency of all such action is to the deposit of fibrous material,—the very material through which cicatricial contractions of other tissues are brought about. Analogous, in a degree, are the conditions which result in stricture of the urethral canal, ten, twenty, or even forty years after the original inflammation; conditions which set in motion a process which culminates, finally, in obstruction to the passage of urine.

It has been claimed that much of the trouble, in so called tertiary syphilis, may be the result of wide-spread fatty degeneration caused by contractions of vessels.

It is well known that fatty metamorphosis occurs more easily in some subjects than in others,—that purulent degeneration is most readily set up in the debilitated and diseased. It is also claimed by Hutchinson and others that the liability to and severity of the lesions of the so-called tertiary period of syphilis "is in proportion to the duration of the secondary stage."

Hence we may conclude that the varied degrees and forms of so-called tertiary manifestations depend upon, first, the damage caused during the "duration of the secondary stage," and inferentially in consequence of it; and, secondly, upon the condition of the individual affected, and this quite independently of any specific virus.

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* Hutchinson, London Lancet, January 31, 1874, page 159.

Notwithstanding the variety in locality, physical characteristics and date of appearance, the sequelæ of syphilis practically call for the same remedial measures. Whether it be a superficial scaling or a tubercular eruption, an ulcerative lesion of the integument, an osseous swelling or a necrosis, a tumor in the cellular tissue or in the brain, or in any other organ or locality; whether it be a painless hypertrophy of the tongue or of the testicle. No matter how slight in degree or how destructive, all the lesions of this period are, as a rule to which there are few exceptions, most efficiently treated by some form of mercurial combined with the iodide of potassium. It is only necessary to know that the lesion presenting is a legitimate sequel of syphilis to determine the character of the remedy to be used. The form, the size and the frequency of dose will be suggested by the circumstances of each case, but the agents through which we may expect the most rapid removal of the so-called "gummous material," upon the presence of which we are warranted in believing that all the trouble depends, are mercury and the iodide of potassium. It is the living material obstructing nutrition of parts which in every instance produces the destruction of tissue as well as disturbances of function that characterize the sequelæ of syphilis. This is the inevitable conclusion to which we are led by the published results of examinations made by the most accomplished pathologists of modern times. There is no disagreement in regard to the presence of the so-called "gumma" of syphilis. Destruction from the influence of syphilis may occur at any point where lymphatic vessels are present—in other words, at any point to which nutritive material is carried; not only to the skin, the cellular, muscular, bony, and even cartilaginous structures, but to every part of the brain and nervous system. It will also be found that the behavior of tissues and structures, infiltrated with the so-called gummy material of syphilis, in all forms in which it presents a destructive result, shows nothing either by inoculation or by any physical property which proves it capable of acting except by the mechanical influence of its presence, by interfering with function and cutting off nutrition, through diminishing the calibre of blood-vessels, or possibly effecting their entire obliteration.

The measures, theoretically, most efficient in setting up a tissue metamorphosis in and removing this gummy material are those which practically and clinically are found most promptly serviceable in curing the late lesions of syphilis. In point of fact it is so well understood that mercury and the iodide of potassium, when judiciously administered have a specific influence in curing the sequelæ of syphilis, of whatever form or degree, that whenever a case occurs in which the diagnosis is doubtful, it is customary to test the character of the lesion in question by use of these remedies, failure to relieve constituting a positive evidence against the syphilitic origin of the trouble.

The administration of mercury and the iodide of potassium combined is found most serviceable in the early syphilitic sequelæ, as for instance, in the tubercular eruptions which may appear before the contagious syphilitic principle has been eliminated from the affected organism, that is to say, within the first two or three years from the date of the acquirement of the disease.

These remedies, combined as in the following formula, are usually well borne:

℞ Hydrarg. Biniodide	gr. iii.
Potassium Iodide	ʒ iii-vi.
Tr. Aurant Cort.	
Syrup „	aa, ℥ i.
Aquæ	ad, ℥ viii.

M

Sig. A teaspoonful thrice daily after meals.

As the ordinary teaspoon holds somewhat more than a drachm, it will be found that the patient in the above prescription will get one-sixteenth gr. of the biniodide, and about 4 to 8 grains of the iodide of potassium at a dose.

The same may be judiciously used in every form, stage and date of syphphilitic sequelæ. If however, the lesion is one whose destructive action is a prominent feature, or the brain or nervous system is the seat of the affection, the iodide of potassium may be increased by the addition of a drop of the saturated solution,

Potass. Iodide	ʒ viii.
Aq. Destillat.	ʒ viii.

M

at every dose, in from a wineglass to a tumbler of milk or water (preferably the former), up to 60 or 80 drops, or until troublesome iodism results. The favorable effect of this treatment may be often seen at once, but occasionally no benefit will be observed until the dose of the iodide has reached a very high point, ʒ i. at a dose, and in cases of cerebral gummata this dose may require to be continued over a very long period, several months or even longer. In the very largest majority of cases the foregoing plan may be successfully pursued, varying the amount of mercurial or of the iodide within the limits indicated in proportion to the gravity and urgency of the case. The mercurial reaches its limit of efficiency when the constitution becomes slightly affected by it, as indicated by softening or tenderness of the gums and teeth, and should at that limit always be stayed. Should the iodide of potassium fail of toleration, the iodide of sodium may be substituted and better borne in the same doses. If still iodism quickly result, as indicated by irritation of mucous membrane of the digestive tract. The tincture of iodine may be administered in doses of 10 to 40 drops in a wineglass or mass of starch prepared for laundry use, or what in my experience has often been a most serviceable and agreeable substitute for the iodide of potassium and sodium:

℞ Iodine (Crystals),	gr. xviii.
Iodide Potass.,	ʒ i-iii.
Aquæ	gr.
Stuart's Syrup or Plain Molasses,	ad., ℥ viii.

M

Let stand 12 hours.

Sig. From a dessert to a tablespoonful, 3 or 4 times a day, after meals.

Cod liver oil is always indicated in cases when any cachexia is present from syphilitic influence, or debility from any other cause. The diet should be simple and nutritious, and adapted judiciously to the condition of the patient. Stimulants denied except in cases of especial urgency on account of habitual use and great debility—red wines permitted at meals in moderate quantity.

The pursuance of the general plan just presented covers all cases as far as internal remedies are concerned. Mercurial fumigations may be, and often are, promptly serviceable, especially in the ulcerative lesions, and may be substituted for the internal administration of mercury. Twenty grains of resublimed calomel may be vaporized in a Lee's lamp, placed under a cane-bottom chair and the patient covered in with a rubber cloak, or even an ordinary blanket, and this repeated three or four times a week—due care being used to prevent taking cold after the operation—and continued until the disappearance of the lesions, or the occurrence of the specific effect of the mercurial.

In regard to local applications for the non-ulcerating forms of trouble ointments containing a mercurial ingredient, such as the ung. hyd. nitratis or ung. hyd. præcip. alb., or a combination of the oleate of mercury (a 6 per cent. solution), with an equal quantity of cosmoline or vaseline is often serviceable, especially in the scaling and non-ulcerating tuburcular eruptions.

For local application to open ulcerations or losses of tissue through the influence of the so-called gummy infiltration, especially when advancing, pointed and painful, the powdered iodoform is often promptly beneficial. In all forms of open lesion of syphilitic origin this drug appears to be especially potent in its sedative, antiseptic and healing properties, perhaps it is the most so of any, but its unpleasant and most characteristic odor renders it often a doubtful blessing. Recently a combination of thymol with other aromatics, rich in the phœnitic principles has been introduced, claiming to take the place of carbolic acid and iodoform, in efficiency as a local application and to be free from their objectionable odor. Experience with this preparation, which is termed "listerine," has confirmed this claim in so far as its power to correct fetid discharges from the naso pharyngeal cavities, when used in the form of spray, and this without pain or other discomfort to the patient. It has also been found to be serviceable in stimulating sluggish ulcerations, but for sedative and healing properties the iodoform cannot yet be dispensed with in cases of advancing syphilitic ulcerations.

Throughout the treatment of the sequelæ of syphilis the effort to appreciate the causes of any presenting trouble—the influences local and constitutional which may tend to modify, or aggravate, or interfere in any way, with the favorable progress of recovery should be unremitting, and not to rely upon or seek after some drug or prescription which is vaunted for the cure of syphilis. Judicious attention to the general health and to the idiosyncrasies of patients often brings success in cases which would otherwise result disastrously. Many subjects of syphilitic sequelæ suffer greatly from the apprehension of communicating the disease to others. They are entitled to the assurance that such troubles are not contagious, and are of purely personal interest after a lapse of four or five years from the occurrence of the initial lesion of syphilis, and this, whether a systematic course of treatment has been pursued in the interval, or the patient has been quite neglected in this respect. It is quite true that many cases have been reported claiming communication of syphilis five, ten and even twenty years after the acquirement of the disease, but a single well observed, well authenticated case, reported by a competent authority, has not yet come to my knowledge, nor have I ever known such an accident to occur after three years from the date of the initial lesion.—F .N. OTIS.

TABES DORSALIS—*See Locomotor Ataxy.*

TABES MESENTERICA, or tubercular degeneration of the mesenteric glands, resembles chronic or tubercular peritonitis very closely in its symptoms. It is rather a rare affection. Children from the twelfth month to the eighth year are most liable to it, but it is especially rare before the fifth year.

The presence of small quantities of tubercle in the mesenteric glands is, however, exceedingly common.

The symptoms are pain, more or less persistent, in the abdominal region, so that the child lies at such times with its legs drawn up to the belly; the bowels are irregular, confined or relaxed, the stools often clayey and offensive, the abdomen remains large and tumid, whilst the rest of the body wastes (and this will distinguish such enlargement from that of rickets, (*e. g.*), and debility rapidly increases The disease cannot be diagnosed with absolute certainty until the enlarged glands can be felt through the abdominal walls, and this never happens until the disease has progressed for some time.

As the glands become enlarged, various symptoms referable to pressure upon neighboring organs are manifested. Œdema and enlargement of the abdominal veins are common. Ascites is commonly, but not always, present· the mechanism of its production may be either pressure upon the thoracic duct or vena portæ, or chronic peritonitis occurring at various times in the progress of the disease; such peritonitis is rarely general, it is more often local, and post-mortem patches of recent and remote origin may be found. In such cases, pain, fever, and the other ordinary symptoms of peritonitis, may be absent or so obscure as to attract no attention.* Occasionally the ascites is very considerable, and fluctuation is very distinct; it is, perhaps, more often small in quantity, and the fluctuation indistinct from adhesions. There may be considerable tympanites, occasionally vomiting and diarrhœa, the tongue usually pretty clean, and the appetite good. Cases are seen in which no swelling whatever of the abdomen occurs; it is, on the contrary, rather shrunken; in such cases the tumor can usually be felt easily; it is hard, roughly nodulated, and somewhat movable. The tubercular deposits of tubercular peritonitis, *e. g.*, in the omentum, etc., are generally softer, less nodulated and more movable. Fever, pain, early abdominal swelling and tenderness, with more or less obscure fluctuation, as prominent symptoms, point to peritonitis; but inasmuch as the two diseases may coexist, the diagnosis is often very difficult. Considerable hypertrophy of the cervical glands will indicate the probability of tabes rather than peritonitis.

Hectic fever sets in towards the close, the pulse becomes extremely rapid, and profuse sweats are common; the child dies at last either of exhaustion, of some inter-current attack of enteritis, or peritonitis. The disease frequently lasts for months, with exacerbations and remissions, and it does occasionally, but very rarely, terminate in recovery.

The treatment will be mainly that of tubercle elsewhere, viz., supporting the strength, correcting the disordered state of the liver and bowels, and the administration of iodide or phosphate of iron, the hypophosphites of lime and soda, and cod-liver oil. Inunction of iodine ointment and cod-liver oil is useful. Change of air, especially to sea-air, is all important, and bathing in warm or cold sea-water, according to the season of the year, should be resorted to. Raw meat, cream, chocolate, and cocoa, are valuable nutriments in these cases. Dr. Dobell recommends pancreatic emulsion in teaspoonful doses every four hours.—E. Ellis.

TALIPES—*See Club Foot.*

TARSAL TUMOR—*See Eyelids, Diseases of.*

TARSUS, Disease of, usually begins in the bones.

Diagnosis.—From disease of the ankle-joint by the swelling being below the malleoli in affection of the astragalo-calcaneal joint, and by the motion of the ankle-joint being comparatively free ; of course, disease of anterior part of tarsus is easy to distinguish from ankle-joint disease. Diagnosis of exact tarsal joints and bones affected very important from its bearing on treatment. When the swelling, tenderness, etc., are on the outer side of the foot, whether affecting os calcis, or cuboid, or both, if disease be inveterate, excision is decidedly indicated. But when disease affects scaphoido-cuneiform joints, and centre of tarsus, the necessity of amputation is to be feared. Excise for disease of astragalus, or astragalo-calcaneal joint. Disease of os calcis. usually confined to bone, not reaching any joint for some time, It should be gouged out. Exact diagnosis is easiest when there are sinuses through which dead bone can be felt. Sulphuric acid, slightly dilute (1 in 3), well adapted for dissolving dead bone in some of these cases. In early stages, rest, pressure, etc., combined with outdoor exercise, indicated. A high heel should be placed on the sound foot, a plaster of Paris bandage on the diseased one, and the patient sent about on crutches. (*Vide* Bone, Scrofula, &c.)—C. B. KEETLEY.

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* See a case reported in the "Lancet," of August 21st, 1869.

TARSUS, Excision of—*See Excision of Joints.*

TESTICLE, Diseases of.—Abscess, Absence, Atrophy, Cancer, Cystic disease, Development imperfect, Enchondroma, Fibrous and fibrocystic tumor, Hernia testis, Inflammation (orchitis and epididymitis), Injuries, Malposition—Inversion, Testicle in perineum, Testicle in groin below Poupart's ligament, Retained testicle in abdomen, in inguinal canal, Neuralgia, Scrofulous testicle, Syphilitic testicle.

TESTICLE, ABSCESS OF.—*Causes.*—Generally chronic or sub-acute orchitis, of syphilitic or scrofulous origin. *Occasional Results.*—Hernia testis, troublesome sinuses, and recurrent inflammations. *Treatment.*—Apply general principles. Do not open too early.

TESTICLE, ABSENCE OF.—An extremely rare condition, except in cases of general abnormality of the genital organs. Curling quotes trustworthy case from the Practice of Page, of Carlisle.

TESTICLE, ATROPHY OF.—*Causes.*—1, the contraction of lymph effused in the course of any variety of orchitis; 2, similar contraction the result of hæmatocele, and even of hydrocele; 3, excesses, sexual or alcoholic; 4, varicocele; 5, operations for varicocele, especially those in which the spermatic artery is injured; 6, elephantiasis scroti; 7, injuries of the head; 8, injuries of the spine; 9, blows on the back of the neck; 10, old age. *Treatment.*—Remove the cause if possible; use means to excite the arterial circulation in the part and to support the veins. Attend to general health. In some cases rest, in others exercise of the genital organs will be indicated. *Prognosis* depends on cause and persistence. In genuine cases, bad.

TESTICLE, CANCER OF.—Almost always encephaloid. *Pathology.*—Begins usually in the body of the testis. At first the tubular structure of the testicle is spread around the cancerous mass, not mixed with it. Cancerous mass is soft and pulpy, generally whitish in color; cystic, cartilaginous and fibrous masses occasionally interspersed. Growth usually rapid. Very little tendency to ulcerate through skin. Great tendency to infection of lumbar glands. Secondary formations occur in lungs and elsewhere. Inguinal glands sometimes affected. *Signs.*—A solid enlargement of the testicle progressing rapidly, without inflammation, is almost always cancer. Testicle smooth and firm, till localized softening occurs. Pain, dull. Special testicular sensation no longer evolved by pressure. Cord not affected early. General health perfectly good at first. *Diagnosis.*—The first thing is to make sure that the enlargement is solid. A trocar will settle this in doubtful cases. (*Vide* Hydrocele.) Next, a diagnosis has to be made from orchitis, syphilitic, scrofulous, or simple. History, concomitant symptoms, and the effect of mercury, pot. iod., oleum morrhuæ, etc., help to decide this. "The diagnosis from cystic disease may be based partly upon the rate of growth, but especially upon the information elicited by the trocar." (Humphry.) *Prognosis.*—Usually fatal in one and a half to two years. Many causes of removal without recurrence have been recorded. *Treatment.*—Unless the disease has spread to the abdomen, remove the testicle.

TESTICLE, CYSTIC DISEASE OF.—*Pathology.*—A tumor consisting of multitudinous cysts, of any size up to that of a walnut, with thin walls, lined by tesselated epithelium, and containing fluid varying in consistence from that of serum to an almost gelatinous thickness. At least three views as *to the origin of cysts, viz.:* (1) dilatation of tubuli seminiferi, (2) dilatation *of tubules of rete testis,* (3) a fibrous or fibrous-cartilaginous tumor in the testicle, with more or less of cyst formation in the tumor. The cysts are sometimes "proliferating," containing fibrous or cartilaginous masses. *Symptoms and Diagnosis.*—Negative symptoms, such as absence of pain, of thickening of the cord, of inflammation, and of constitutional disease, together with positive symptoms, such as smoothness, oval or spherical form, and slow growth, generally reduce the final diagnosis to a distinction from hydrocele or hæmatocele. Cystic disease is heavier than hydrocele, fluctuates less, and is non-transparent. Moreover the testicular sensation usually remains and is diffuse owing to the glandular substance being present on every side of the tumor. In hydrocele and hæmatocele, this sensation is, of course, confined to the seat of the testicle. A good-sized trocar is usually employed to settle the question. *Treatment.*—Castration. But if a patient has only one testicle, a less radical operation may be considered.

NOTE.—Cystic disease is sometimes associated, not only with enchondroma, but with recurrent sarcoma and with soft carcinoma.

TESTICLE, IMPERFECT DEVELOPMENT OF, may occur, affecting either the body of the gland or the epididymus, or both. So also part of or even all the vas deferens may be absent, the testicle being present and even full sized. Such cases may be virile, though necessarily sterile. Another form of imperfect development will be noticed under heading Malposition.

TESTICLE, ENCHONDROMA OF.—Usually associated with cystic disease, sometimes with soft cancer, the small masses of cartilage growing into the cysts. ? as to whether growths commence in lymphatics or in tubuli of the gland. Appearances, naked-eye and microscopic, much like those of hyaline cartilage.* *Diagnosis.*—Characteristic weight and hardness. *Treatment.*—Excision.

TESTICLE, FIBROUS AND FIBRO-CELLULAR TUMORS OF.—Very rare. Refer if necessary to Curling or Humphry.

HERNIA TESTIS, the condition in which, as a result usually of abscess, but sometimes of wound, the whole or a part of the tubular part of the gland escapes through an aperture in the tunica albuginea, and through a corresponding opening in the scrotum. Any form of chronic orchitis may lead to hernia testis. The projection looks like a mass of granulations. Both the tubuli and the margins of the opening through which they protrude are thickened by fibrous deposit. *Treatment.*—Cleanliness, rest, unguent. hydrargyri oxidi rubri or ung. hydrarg. nitrat. locally, or strapping, combined with appropriate general treatment, usually cause the skin to cicatrize over. In more obstinate cases, try incision of constricting edge of tunica albuginea (Pagan of Glasgow), or, after slitting up all sinuses, the edges of the skin wound may be freshened and brought together over the protrusion (Syme). Anything like paring off protusion rarely necessary and usually mischievous.

TESTICLE, INFLAMMATION OF (Orchitis and Epididymitis).—Varieties.—1, Acute; 2, Chronic. A list of sub-varieties might be made out, founded on the etiology, *e. g.*, gonorrhœal, traumatic, syphilitic, scrofulous, metastatic, &c. Vide Strumous Testicle and Syphilitic Testicle.

Acute Orchitis (Inflammation of the body of the testicle).—*Causes.*—Blows, wounds, metastasis (mumps), and rheumatism. *Symptoms.*—Ordinary signs of inflammation, viz., pain, tenderness, heat, redness, swelling. Effusion into tunica vaginalis. When accompanying mumps, it begins about the fifth or sixth day. *Treatment.*—Rest, suspensory bandage, cold lotions, aperients, antimony (Antim. potass-tart. gr. j aquæ fervent. ℥ viij;

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* Mr. Savory once observed of a section of lovely specimen, "Like pearls only more precious."

℥ j 4^{tis} horis). Leeches: they should be placed over the cord (Humphry). Puncture of tunica vaginalis, or even of testicle, with a sharp, narrow-bladed knife.

Acute Epididymitis.—Frequently, though not quite accurately, termed "acute orchitis." *Causes.*—Mostly gonorrhœa. Any urethral irritation, *e. g.*, stricture, catheterization, lithotomy, impacted calculus. Blows. Rheumatism, gout. Epididymitis may supervene during any stage of a gonorrhœa. *Symptoms.*—Tenderness, pain, swelling, and hardness of epididymis. Effusion into tunica vaginalis. Skin reddened and tender. Constitutional disturbance, fever, sickness. Resolution usually commences within a fortnight, but thickening may persist for months. *Treatment.*—See Acute Orchitis. Worth while to persist with treatment in order to remove the residual thickening, as the latter, if left may interfere with function of testicle. Suspensory bandage, moderation in all things, and, experimentally, pot. iod. internally.

Chronic Orchitis.—*Causes.*—(1) acute orchitis; (2) syphilis; (3) struma; (4) injuries. Acute inflammation in the testicle, as elsewhere, sometimes subsides into chronic. Most cases of chronic orchitis are syphilitic, and very indolent. See Strumous Testicle, and Syphilitic Testicle. The treatment for syphilitic is adapted also for non-specific, chronic orchitis.

Testicle, Injuries of.—Blows cause intense shock. Mobility of testicle and strength of tunica vaginalis greatly protect testicle. Extravasation into cord may extend up to kidney or even higher. Chronic and more rarely acute orchitis may supervene. This orchitis may hopelessly damage organ. *Treatment.*—Apply general principles. Testicles bear incised wounds well. Recovery from self-mutilation usually rapid.

Testicle, Inversion of.—When testicle lies in front of, instead of at back of, scrotum, it is liable to be injured in tapping a hydrocele.

Testicle, other forms of Malposition of, are known as: 1, retained testicle; 2, descent of testicle into perineum; 3, descent of testicle into groin. The testicle in the perineum is liable to injury, especially during riding. Operations to restore it to the scrotum have been performed by Adams and by Annandale. An undescended testicle may remain above the internal and abdominal ring, or may enter the inguinal canal. Size and maturity of gland then sometimes imperfect; but impotence not necessary, and perhaps not usual, even when both glands are retained. Liability to certain accidents, *e.g.*, (1) inflammation, which may be confounded with strangulated hernia or with bubo; (2) attacks of severe pain, owing to testicles being suddenly "trapped" between abdominal fasciæ; (3) encysted hydrocele; (4) complication with congenital hernia frequent. Excessively troublesome testicles in inguinal canal have been excised. *Treatment.*—When a hernia adherent to testicle threatens to descend with it both had better be kept in abdomen by a truss. When a non-adherent congenital hernia exists apply a truss above testicle and below hernia; or if testicle is still in abdomen, dispense with truss for a while, in the hope that it may descend. Be in no hurry to operate upon a hydrocele of the testicle in the inguinal canal. Remember that tunica vaginalis cavity usually in these cases communicates with that of the peritoneum.

Testicle Neuralgia of (with which may be associated "irritability," or "hyperæsthesia," or tenderness of the testicle; although this condition may exist separately.) *Causes and Pathology.*—(1) reflex: (2) the obscure state of the nerves and vessels of a part commonly associated with neuralgia elsewhere, and manifested chiefly by signs of congestion; (3) in some rare cases the presence of coarse organic disease, *e, g.*, chronic abscess (vide specimen in Hunterian Museum); (4) malaria. Reflex neuralgia results from stone in the bladder or kidney, from varicocele, indigestion, &c. *The age most subject* is the period of puberty and the next ten years.

The exciting cause, frequently, undue excitement of the genital organs. *Prognosis.*—Time almost invariably works a spontaneous cure, both of the individual attack and of the disposition to it. Remove the cause. Treat varicocele, indigestion, &c. Suspensory bandage,* cold bath, moderation in diet and in exorcise of gland, &c. Quinine for intermittent cases. Hypodermic injection of morphia (quarter grain). Horizontal position or elevation of pelvis and lower extremities.

STRUMOUS TESTICLE.—*Causes.*—*Vide* Scrofula. *Pathology.*—A deposit of tuberculous matter takes place within the convoluted tubes of the epididymis. This matter is probably at first mainly a collection of epithelial cells. Subsequent change into a cheesy or into a calcareous mass. In the meantime chronic inflammation tends to destroy the walls of the tubes, and to connect the tubercle into one mass. Color of tubercle white or yellowish white. Disease usually begins in epididymis, but when it commences in the body of the gland small scattered gray tubercles first appear. These enlarge and coalesce in parts of the gland. The ordinary processes of chronic inflammation occur around the deposits. These usually result in formation of abscesses and sinuses. Vas deferens usually thickened. Both testicles often affected. Coincident disease of lungs frequent, and of kidney, prostate, vesiculæ seminales, &c., occasional. *Signs.*—Epididymis and sometimes body of gland enlarge slowly; very little pain, except when abscess is ripening. Formation of abscesses. Thickening of vas deferens. Scrofulous appearance of patient. Sometimes coincident disease of lungs, &c. Any ordinary affection of testicle may be the commencement of strumous disease in a strumous person. *Prognosis.*—With suitable treatment many cases make a satisfactory recovery, the tubercle degenerating and becoming encapsuled or discharged. *Treatment.*—*Vide* Scrofula. Suspensory bandage, cold sponging in indolent cases, iodine externally. Lay open and clean obstinate sinuses. Only in thoroughly hopeless cases, such as resist treatment and obviously undermine health, is excision justifiable. *Vide* Hernia Testis.

TESTICLE, SYPHILITIC.—A tertiary manifestation. *Pathology.*—(Compare with STRUMOUS TESTICLE. See above). Generally confined to body of gland, epididymis and cord remaining healthy. Deposit of lymph in areolar tissue between the tubules, sometimes in nodules. Different lobules affected in different degrees usually. Lymph-nodules upon tunica albuginea. Disease sometimes spreads to tubuli. Tendency to fibrous degeneration, eventual contraction, and even atrophy of the affected gland. Both testicles often attacked, usually one after the other. Liability to abscess and hernia testis. *Symptoms.*—Enlargement usually slow. Amount of pain depends directly on rapidity of progress. Frequently neither pain nor tenderness. Stony hardness. Knotty feel (not always). Epididymis not usually distinguishable from rest of gland. Hydrocele often coexists. History of syphilis, perhaps other collateral symptoms, *e. g.*, nodes. *Diagnosis,*—Compare symptoms, as given above, of strumous testicle. Chronic orchitis caused by injury, or by stricture, can scarcely be distinguished from syphilitic, except by the history and general symptoms. But it requires similar treatment. *Prognosis.*—Danger of atrophy. Liability to relapse. Quite under control of antisyphilitic remedies. *Treatment.*—Support by strapping may be employed, unless suppuration be progressing. Suspensory bandage. Iodine or mercurial ointment locally when pressure is not advisable. Open abscesses early. Give iodide of potassium internally, or order mercurial inunctions. *See* Syphilis.—C. B. KEETLEY.

TETANUS.—*Causes.*—1, wound; 2, catching cold; 3, race; 4, male sex. Wounds in which nerves are lacerated or left in contact with sharp spiculæ of bones, or with foreign bodies, and wounds of the hand or foot, are said to be especially liable. Tetanus is a more common complication of compound fractures than of surgical operations. Exposure to cold or sudden change of temperature, rarely acts without a pre-existing wound. Negro race is very subject.

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* See VARICOCELE.

Pathology.—Richardson, Billroth, and others, teach that it is a zymotic disease, *i. e.*, a poisoning of the blood through the absorption of septic material, which septic material is formed by decomposition in the wound. Brown-Séquard and many others regard tetanus as an affection of the spinal cord which has spread from some irritated sensory nerve or nerves in the wound when there is one. In favor of the latter theory may be cited cases in which the spasm has been confined to the injured side of the body, or even to the injured limb itself. Often no post-mortem appearances have been seen in the cord; sometimes softening of the central gray matter. It has been truly observed that great changes ought not to be expected, because "it would be quite impossible for motor impulses to originate from a spinal marrow reduced to a mass of debris." Coates (see *Med. Chi. Trans.* vol. xli.) observed changes in medulla oblongata like those in cord, and even a morbid condition of the motor regions of the convolutions. There was an accumulation of leucocytes round the vessels of the medulla, of the cord, and of the kidneys, which, in his opinion, supported the theory, of a poison circulating in the blood.

Symptoms and Course.—Typical case. A man with compound fracture of forearm, about three or four days after the accident, complains of pain in the part, and is rather feverish. The next morning his neck is stiff and his jaw also: he thinks he has caught rheumatism in that region. Within twenty-four hours short spasms of the back occur when the patient is momentarily exposed or fed or otherwise excited. The spasms rapidly affect also the abdomen and the extremities, and now, instead of being merely transitory, as at first, they never wholly pass away; the abdomen feels hard like a board, the back is arched (opisthotonos), the hands are clenched, the face marked by risus sardonicus, and the jaw much more fixed than before. Skin bathed in perspiration. Temperature raised to about 100° Bowels constipated. Respiration impeded by stiffness of respiratory muscles (chest "as if in a vise"), intellect quite clear, no sleep; pain in the muscles, becoming intense when the spasms are aggravated. Slight noises, draughts, and other trifling irritants cause the tetanic spasms to be suddenly trebled in force. During one such paroxysm, patient dies asphyxiated, or he lingers on for a few days or a week, and perishes of gradual asphyxia (carbonic acid poisoning) or of exhaustion. Such is the course of acute tetanus, and traumatic tetanus is usually acute. But the disease is sometimes chronic, especially if it be idiopathic. Then all the symptoms are less severe, the patient is able to take a fair amount of nourishment, and gets some sleep. His breathing is not seriously interfered with, and he has considerable chance of recovery. There are intermediate grades of severity of every shade. Expression of face called risus sardonicus arises from contemporary spasm of all the muscles of the face, dilators, compressors, levators, depressors, altogether. Thus every line is deepened and every feature fixed by the muscles, just as a ship's mast is by its stays. This expression may persist long after otherwise perfect recovery. Sometimes the trunk is arched forward (emprosthotonos) or sideways (pleurosthotonos).

Tetanus Neonatorum is attributed to the wound caused by dividing the umbilical cord. It is first observed by the mother or nurse in consequence of the lock-jaw preventing entrance of finger or nipple into mouth. Course presents nothing peculiar. Almost always fatal.

Diagnosis of Tetanus—From (1) strychnia-poisoning, (2) hydrophobia,

(3) hysteria, (4) rheumatism. Strychnia-poisoning is much more rapid, both in its onset and in its advance to a fatal result. The paroxysms of spasm are interrupted by periods of complete relaxation. Hence there is no continuous lock-jaw. Death almost always takes place within two hours, at latest. In tetanus, the most rapid death on record was after four hours' duration. Hydrophobia. See following table (abbreviated and slightly modified from Poland):

TETANUS.	HYDROPHOBIA.
1. Spasms continued (tonic).	1. Intervals of complete relaxation (spasms clonic).
2. Cause—wound or exposure to cold.	2. Bite of a rabid animal.
3. Appears generally soon after injury.	3. Period of incubation usually a month or more.
4. Risus sardonicus.	4. Countenance expressive of excitement, fearful distress and peculiar restlessness; occasionally frightfully convulsed; eyes bright and glistening, but at times suffused.
5. Frequently gastric pain, but no vomiting.	5. Thirst; often aversion to fluids; discharge of viscid saliva.
	6. Vomiting and gastric pains.
	7. Mind becomes delirious.
	8. No authentic case of recovery.
	9. Intolerant sensibility of surface and organs of sense.

Prognosis.—Acute traumatic tetanus almost always fatal. Subacute traumatic tetanus often recovers, especially if it does not appear till some time after the wound, and progresses slowly. The prognosis is favorable according to the duration of the disease. Thus, a tetanus which has endured three weeks is extremely likely to recover. Idiopathic and chronic tetanus have a favorable prognosis The longest duration of any recorded fatal case has been thirty-nine days.

Treatment.—Remove every source of excitement, keep the room dark and silent, lay down thick carpets, protect from draughts by screens. Cover the patient with light, warm clothing, so as to encourage copious diaphoresis. Examine the wound very carefully if one exists. Remove any foreign body or splinter. If a nerve is believed to be irritated, a portion of its course may be excised. Those who regard tetanus as a septic poisoning would be justified in taking measures to make the wound antiseptic. Amputation has been done. Many drugs have been tried, chiefly anodynes and antispasmodics. Most surgeons now chose between chloral, morphia subcutaneously; opium internally, and calabar bean. Curare. Chloroform. Quinine. Ice-bags to spine. Of Calabar bean, Garrod writes : " In tetanus, enough must be given to produce the physiological symptoms of the drug. One-third gr. of the extract, rubbed up with 10—15 minims of water, and neutralized with a little carbonate of soda, may be injected every two or three hours subcutaneously, where swallowing causes pharyngeal spasm. If given by the stomach, 1 gr. of the extract, rubbed up with a little weak spirit. According to Frazer, Calabar bean should be given at the very onset of the attack, for the contraction of muscles begets a substance which excites muscular contraction. When Calabar bean is given, its action should be carefully watched, lest the respiratory muscles become paralyzed by it. Rational indications, derived from the post-mortem evidences of hyperæmia, &c., of spinal cord, are to give belladonna, and to employ every available means of diminishing spinal congestion (Fitzgibbon, *Dublin Med. Jour.*, March, 1877). And also, I think, if the wound be not too large, to swab it thoroughly with pure carbolic acid. The patient should be patiently and frequently fed with milk and the strongest beef-tea. Tracheotomy has been recommended when there is a tendency to laryngeal spasm.—C. B. KEETLEY.

TETTER, Moist—*See Eczema.*

THORACIC ANEURISM—*See Aneurism.*

THROAT, Ulcerated.—Ulcers are very common in connection with the various structures of the throat, being either acute or chronic. They may be enumerated as: 1. Catarrhal, which are slight and superficial, being very frequently observed, especially at the back of the pharynx, and often associated with chronic catarrh. 2. Follicular. These ulcers are generally small, and circular or oval, corresponding to the follicles, but by their union they may become irregular and of some size. 3. Syphilitic, either secondary or tertiary. 4. Scarlatinal. 5. Diphtheritic. 6. Ulcers following eruptions, such as herpes. 7. Gangrenous or sloughing sore throat, cynanche or angina maligna. This form of ulceration is generally associated with syphilis or scarlatina, but may be independent of these affections. Thus it may follow severe catarrhal inflammation, if the patient is in a very low state of health from any cause; and occasionally it occurs as a complication of typhus, enteric fever, or other exanthemata. It spreads more or less extensively, but not as a rule deeply; the mucous membrane is dusky, while there is much œdema around. 8. Ulcers on the tonsils simulating syphilitic ulcers, but probably originating in blocking up and subsequent inflammation of their follicles. 9. Cancerous ulceration, which is extremely rare.

Symptoms.—Ulceration of the throat may be unattended with any symptoms, even when of considerable extent. Usually, however, local symptoms are present to a greater or less degree. There may be merely uneasiness or pain and difficulty in swallowing, but when certain parts are destroyed, most unpleasant and dangerous symptoms are liable to arise. Food, especially of a liquid kind, may tend to pass into the posterior nares or down the larynx instead of into the œsophagus. The voice is often completely altered, being thick, guttural, and indistinct; or the patient may scarcely be able to articulate at all. Offensive matters are hawked or coughed up; and the breath is in many cases very foul, sometimes peculiarly so. It is important to notice that dyspnœa is not uncommonly present, being attended with very noisy baeathing; and that there may be a liability to sudden death from suffocation, in consequence of the ulceration involving the upper opening of the larynx. In some cases there is also a danger of hæmorrhage.

Ulceration of the throat is often attended with a low condition of the general health, and there may be much emaciation and debility, owing to inability to swallow food. In gangreneous ulceration there is a danger of septicæmic symptoms setting in. Of course when the ulceration is a part of some special disease, such as scarlatina, the general symptoms will be modified accordingly.

The ultimate local consequences of ulceration are also liable to be very unpleasant, or may even prove dangerous in the way of permanent destruction of tissues, adhesions, and contractions after cicatrization. I have seen a case in which the throat was one large chasm, with thickened bands extending along its walls, every trace of its various parts having disappeared. Of course under these circumstances swallowing becomes very difficult, and the voice is permanently altered.

Diagnosis.—It must be borne in mind that the throat may be ulcerated without any complaint of local symptous being made by the patient. The smell of the breath has in not a few instances led me to the discovery of unsuspected ulceration in this part, and when this is fetid, the throat should always be carefully examined. In conducting the examination it is necessary to raise the uvula, in order to see the upper part of the back of the pharynx, as ulcers are not uncommon here, and may otherwise be overlooked. It is important to determine the nature of any ulceration of the throat, and especially whether it is of a syphilitic character.

Prognosis.—Ulceration of the throat may prove immediately dangerous, in consequence of interfering with deglutition, and thus affecting nutrition; spreading to the larynx; giving rise to hæmorrhage; or inducing septicæmia. Some forms are difficult to cure. The destructive effects of ulceration may lead to serious permanent mischief.

Treatment.—1. Local.—For most ulcerations of the throat nothing answers better than the frequent use of chlorate of potash as a gargle (ʒ ij–iij to Oj); or in the form of lozenges or spray. Follicular ulcers, as well as other chronic forms, often require to be freely touched with nitrate of silver or its solution. When the surface is sloughy, antiseptic gargles must be abundantly employed, such as one containing Condy's fluid, carbolic acid, creasote, or chlorine, and they may be used alternately with the chlorate of potash gargle. In gangrenous forms of ulceration exhibiting a tendency to spread, it is advisable to start by brushing the surface over carefully with strong nitric or hydrochloric acid, the proceeding with the other application. Inhalations containing carbolic acid, creasote, or other antiseptics are also very valuable.

2. General.—It is very important before commencing treatment to determine the nature of any throat ulceration, and especially whether it is due to syphilis. If such is the case, iodide of potassium with decoction of cinchona bark or quinine generally produces the best results. Sometimes a course of mercury is required, but it must be conducted with care. It will often be found, even in syphilitic cases where there is much sloughing, that dilute nitric acid with decoction of bark brings about rapid improvement, and this mixture is very useful in other forms of gangrenous ulceration. Tincture of steel, in doses of m xx–xl every four or six hours, is also exceedingly valuable, especially if there is much debility, and it may be combined with quinine. The internal administration of chlorate of potash is recommended as a specific remedy in throat ulcerations. It has appeared to me to answer just as well if freely employed locally, but it may be given as a drink. Dr. Sansom advocates the use of the sulpho-carbolates.

Not uncommonly one of the most important matters requiring attention is the feeding of the patient. In many cases, owing to great difficulty or pain being experienced in swallowing, very little or no nourishment is taken, and hence the system becomes greatly lowered, so that healthy action cannot take place, and the ulceration will not heal. Under these circumstances the patient must be compelled to take small quantities of beef tea and milk at frequent intervals, and in this way a considerable amount of nutriment may be administered. If this is persevered in for a short time the patient generally becomes able to swallow easily, and there is a marked effect for good produced on the ulceration. At the same time a good quantity of port wine should be given in similar small doses. If deglutition is really impossible, nutrient enemta must be employed.

When there is much dyspnœa accompanying throat ulceration the patient must be carefully watched; as remarkably sudden death may occur from suffocation, and laryngotomy or tracheotomy may be called for at a moment's notice. Indeed, in cases attended with great danger it is decidedly advisable to open the larynx as a precautionary measure, so that there may be no fear of sudden death, while at the same time the ulcerated structures are left in a state of rest, and therefore in a more favorable condition for undergoing the healing process.—FREDERICK T. ROBERTS.

THROMBOSIS—*See Veins, Diseases of.*

THROMBOSIS, Puerperal Venous—*See Plegmasia Dolens.*

THRUSH is an affection very common in young infants, more especially in those brought up by hand. It is chiefly of importance as evidencing impaired nutrition. The mucous membrane of the mouth is covered with numerous white specks like small atoms of curd; these are most abundant on the inner surface of the cheeks and on the tongue and fauces. They get larger for a few days, fall off and are rapidly reproduced. The infant's mouth becomes hot, the lips swollen; there is dribbling of the saliva; moreover, there is generally coincident some gastro-intestinal disorder, often green evacuation. The acridity of these motions causes an erythematous blush around the anus, and it is not uncommon to find aphthous spots upon the edge of the mucous membrane of the bowel. The thrush is then said to have "passed through" the child.

According to Dewees, children fed much on farinaceous substances are especially exposed to attacks of this disease, particularly when the food is sweetened with brown sugar. Dr. Eberle says the same, and adds a word of caution regarding sour and stale milk.

Dr. Berg regards artificial food of any kind likely to favor the growth of thrush.

Valleix remarks very distinctly that amongst the many hygienic conditions which may act as predisposing causes only one has satisfied him that it exerts a positive influence, and that is "improper alimentation." Valleix asserts that he has never known a child to have thrush "who had been suckled exclusively during the early months of life." Bouchut and Trousseau bear similar testimony. Trousseau, for instance, says he has "never known an infant die of thrush who had been suckled at a healthy breast"—all valuable testimony to what has before been so strongly insisted on—the incomparably greater value of breast-milk above all other forms of nutriment for a baby. Thrush is especially liable to prevail during the hottest months of the year. Diarrhœa, vomiting, and feverishness, more or less intense, are, in bad cases, concomitant symptoms. There is also much tenderness over the abdomen, and not unfrequently colicky pains.

As in adults, an appearance of a crop of thrush is often but one indication amongst many of the general asthenic condition of the child; it is, therefore, in such cases secondary in character.

Professor Berg, of Stockholm, was the first to discover the Leptothrix buccalis and the Oidium albicans, cryptogamic growths always present in the white specks. The growth of these plants appears to be favored by disturbance to digestion, subacute inflammation of the mucous membrane of the mouth, and acid secretions. As the buccal secretions of the infant for the first six weeks are acid, the prevalence of thrush during that period is thus explained.

Treatment will comprise attention to the general constitutional condition. The bowels are to be regulated, acidity of stomach corrected, great cleanliness observed in all vessels and articles used for feeding the infant, as spoons, bottles, etc. The mouth should be gently cleansed after each feeding with a piece of soft rag. Locally, a solution of borax (ʒ ss—℥ j) is to be applied with a camel-hair brush two or three times a day. This is better than Mel. Boracis, as it is a question whether the honey undergoing fermentation does not increase the mischief. For very young infants a grain or two of borax with a little loaf sugar may be put on the tongue, where it dissolves and is swallowed. This plan is easy of management and very effectual; the borax may also be used with glycerine, and the mother should bathe the nipples after suckling and annoint them with glycerine of borax. We are indebted to Sir W. Jenner for another and very efficacious remedy in sulphite of soda; the secretion of the mouth being *acid, the sulphite is* decomposed and sulphurous acid set free, which *destroys cryptogamic* plants. The strength of the solution may be ʒj of the sulphite to ℥ j of water. Guersent recommends, in severe cases, a lotion of—

℞.	Sodæ Chlorinat.	℥ j
	Decoct. Cinchonæ.	℥ iij
	Syrupi Cort. Aurant.	ʒ j

Fiat lotio.

A solution of salicylic acid, gr. x to the ounce or glycerine and water, or a solution of carbolic acid, may be resorted to, often with very excellent results.

Lastly, a solution of nitrate of silver (gr. v—℥ j) or cautious actual cauterization with nitrate of silver may be tried in extreme cases, and when very obstinate, change of air is eminently beneficial.—E. ELLIS.

THUMB, Dislocation of—*See Dislocations.*

TIBIA, Fracture of—*See Fractures.*

TINEA.—*Tinea Tonsurans—Ringworm of the Head.—Definition.*—A contagious disease of the scalp, caused by the presence of trichophyton tonsurans in the epidermis, the hairs, and their follicles.

Symptoms.——Tinea tonsurans is met with most frequently in children, but is occasionally seen in adults. From the fact that persons who have suffered long from ringworm of the scalp in childhood frequently present patches of tinea versicolor when grown up, it has been supposed that the latter affection is due to a modification of the trichophyton, produced by the difference between the skin of an adult and that of a child. In the early stage, which rarely comes under observation, a small red, erythematous or slightly raised patch arises on some part of the hairy scalp, accompanied by considerable itching. As the patch gradually enlarges, the redness and elevation of the centre subside, and a roundish ring with a bright-red raised margin, often presenting a crop of small vesicles (herpes circinatus), and a paler, rough, or scurfy-looking centre, is produced. If the rings be concentric, an eruptions imulating erythema or herpes iris is produced.

In the fully developed condition ringworm appears as a pale-brown or slaty-looking, roundish patch (½ inch to 3 or 4 inches in diameter), slightly elevated above the adjacent healthy scalp, and covered with short stubbly hairs ⅛ inch long and small opaque branny scales. The hairs are thick, twisted, or bent, frayed at their extremities, have a dull-grayish look, and break off or fall out easily from their follicles, which are somewhat prominent. At this stage the brittleness, loss of color, and deformity of the stubbly hairs are marked features, and should always be looked for. In some instances the parasite excites an acute inflammation of the hair follicles, which become pustular, and as a consequence destruction of the papillæ of the hairs and permanent alopecia may follow.

Eczema is sometimes produced, and the yellowish-green, brittle crusts which then form conceal the appearances of ringworm.

Occasionally ringworm of the scalp becomes diffuse, and much resembles eczema capitis in the scaly stage. After lasting for a variable time ringworm begins to subside, and the patch is covered with fine scales and young hairs, which are apparently normal; or both skin and hairs may, on superficial observation, appear quite natural. Here and there, however, and chiefly at the margins of the patch, short, stubbly, discolored hairs can be found on careful examination, and unless these are eradicated the disease is liable to relapse and to affect other persons.

In a few cases smooth, hairless patches, resembling those of alopecia areata, are produced, which, according to Dr. Liveing, has led to the erroneous belief that there is a parasitic disease (which has been called tinea decalvans) distinct, on the one hand, from tinea tonsurans, and on the other from alopecia areata.

Kerion.—This is a rare condition, in which one or more of the patches of ordinary ringworm becomes raised, tender, and uneven: small prominences, resembling inflamed hair follicles, soon appear, from which a viscid, honey-like secretion exudes and the whole mass becomes what may be termed "boggy" to the touch. As a rule no pus is formed, but the hairs and their follicles are gradually destroyed, the result being permanent baldness.

Tinea Syncosis.—This variation is produced when the parasite attacks the hair of the beard and mustache, and extends into their deepseated follicles. The primary symptom, as in tinea tonsurans, is a red, scaly, and itching patch; the follices next become indurated and tender, forming reddish, prominent tubercles, which suppurate; the hairs become dull and brittle, and are easily extracted. When the pustules and small abscesses round the follicles burst, crusting takes place, but to a less extent than in eczema of the face.

Tinea Circinati.—This results from the development of trichophyton on the non hairy parts of the body; it appears most commonly on the face, neck, and trunk, and may or may not be accompanied by patches of tinea tonsurans; it also shows itself on the hands and arms of those attending to cases of ringworm of the scalp. Small reddish, somewhat raised, circular patches, covered with branny scales, and usually presenting a ring of minute vesicles at their margins, make their appearance, and are commonly attended by marked itching. Fading in the centre, the patch gradually extends at the margins, which are usually vesicular (hence the name herpes circinatus), and forms "fairy rings," like those of other fungi. By the coalescence of these rings irregular circinate or gyrate bands are produced, the rings ceasing to extend and overlap where they blend, as if the material for their further growth had been exhausted in spots already affected with the disease. T. circinati, when it reaches the scalp or hairy parts of the face, gives rise to T. tonsurans or T. sycosis,and is often found in isolated patches in persons affected with those diseases, or in those who have come in contact with them.

Eczema Marginatum.—Affecting the genitals, the inner sides of the thighs, and the buttocks, is merely a variety of tinea circinata occurring in parts where the abundant perspiration, warmth, and friction predispose the skin to inflammatory action. The red, elevated, and itching patches fade in the centre, leaving it deeply pigmented, and at the raised margins vesicles, pustules, excoriations, or crusts are met with. It spreads in the same way and presents the same fungus as T. circinata. In some cases the parasite may not be found, though the eczema which it has started persists.

Diagnosis.—In T. tonsurans the sound, scaly, itching patches on the scalp, the dull, brittle, or stubbly hairs, which are easily pulled out, and the reddish, spreading margin, while the centre is pale, are features which are diagnostic of the disease. When impetiginous crusts hide the whole patch, when smooth bald patches occur, when new hairs are growing and the disease is receding, or when it is in the early stage and appears as an erythematous or vesicular patch, ringworm may be mistaken for eczema of the scalp, alopecia areata, or erythema vesicans. When the entire scalp is affected, it is almost impossible to distinguish it from scaly eczema of the scalp. In all these cases, however, the detection of the parasite in the stubbly hairs, crusts, or scales, after maceration in liq. potassaæ, will clear up the difficulty. The frequent occurrence of T. circinata on other parts of the body, or the detection of dull, brittle, broken-off or distorted, easily extracted hairs, will also help the diagnosis.

Even to the naked eye the appearances of T. kerion are so peculiar that the nature of the affection can hardly be mistaken. In the early stages, where the puffy swelling may simulate a subcutaneous abscess, microscopical examination of the loosened hairs settles the question.

T. sycosis differs from eczema of the beard in the development of indurated tubercles and abscesses, the dull, brittle character of the hairs, which are readily extracted, the presence usually of T. circinata on other parts, and in the presence of trichophyton on microscopic examination. T. circinata and eczema marginatum may resemble some forms of erythema multiforme and of eczema respectively, but the spreading in "fairy rings" and the presence of the parasite are diagnostic.

Prognosis.—Ringworm of the body is usually easily amenable to appropriate treatment, but on the hairy parts, on the other hand, it is extremely obstinate, persisting for months, and sometimes for years, in spite of all remedies, and being liable to recur if the treatment have been left off too soon. The parasite does not endanger life, but is troublesome on account of the loss of hair it causes, the secondary inflammations it sometimes excites, and the marked contagiousness of the affection.

Treatment.—In the different varieties of tinea produced by trichophyton attention must be directed to: 1. The destruction of the parasite. 2. The removal of any secondary inflammation which may have been caused by the parasite or the remedies employed for its destruction.

Where the disease is superficial, as in T. circinata and eczema marginatum, there is little or no difficulty in carrying out the first indication. Lotions containing bichloride of mercury (grs. ij ad ℥ j), sulphurous acid, or hyposulphite of soda (ʒ j ad ℥ j), or the persistent inunction of dilute ammonio-chloride or nitrate of mercury ointments, or of oleate of mercury 5 per cent., are usually curative in a few weeks. Vaseline, oleate of zinc, or bismuth, etc., should be used subsequently if there is any eczema.

In ringworm of the scalp or of the beard (T. sycosis) the main difficulty is to get the parasiticide brought into contact with all the mycelial filaments and spores, many of which lie deep down in the hair follicles. Hence, though the superficial fungus growth is easily destroyed, and the disease appears to be eradicated, much annoyance is caused by the recurrence of the affection, a few conidia which have eluded the poison being sufficient to start a fresh growth, and subsequently to infect other persons. The indications, therefore, for freatment are to: 1. Remove as much as possible of the diseased hairs and epidermis. 2. Use a parasiticide which will penetrate readily and deeply into the cuticle and hair follicles. 3. Continue the treatment, more or less modified, for at least a month after all signs of the disease are gone.

1. The hair over the diseased patch, and for ¼ to ½ inch round, or of the whole scalp, beard, etc., should be cut short with scissors, all crusts removed by oiling or poulticing, aud the surface washed well with soft soap and water. Loose hairs and scales should be removed by rubbing, and in the case of T. sycosis by epilation, which, owing to the loosening of the hairs, is here less painful than in eczema of the beard. Blistering by liq. epispasticus, acetum cantharidis glaciale, or Coster's paint of iodine and oil of wood tar, is also useful for this purpose.

2. A solution of bichloride of mercury in acetic acid (grs. vj to ℥ iv), which has the combined advantages of penetrating deeply, of macerating the hair and epidermic tissues, and of blistering, is one of the best. It should be repeated from time to time, and weak acid nitrate or ammonio-chloride of mercury ointments applied in the intervals to the irritated skin.

3. After removing all the stubbly hairs, and when no further reproduction of the disease has appeared for some time after the last application of vesicants or of the mercury and acetic acid paint, weak ammonio-chloride of mercury ointment should be rubbed in twice a day for some time further, to guard against the possibility of some overlooked portion of fungus starting into fresh growth. Any eczema of the scalp thus excited should be treated in the usual way. Goa powder, or its active principle,

chrysophanic acid, are useful only as irritants, and do not cure tinea tonsurans, though, like simple blistering, they may suffice to remove T. circinata. Any constitutional debility, strumous condition, etc., should be treated with cod-liver oil, tonics, and good food and hygiene, which, though unable to cure the disease, by improving the general health lessen the risk of eczema, etc. Cases of ringworm of the scalp are rarely cured within less than four or six months, and even with the most efficient and thorough treatment they may last for years. In public institutions and schools the separation of the patients and of their clothing, towels, etc., is necessary to check further spread of the disease.

Tinea Versicolor—Chloasma—Pityriasis Versicolor.—Definition.—A parasitic contagious disease, excited by the presence of microsporon furfur in the epidermis, usually occurring on the trunk as yellowish or pale buff-colored patches.

Symptoms.—Tinea versicolor does not occur in childhood, and is hardly ever seen after fifty; it is met with most frequently between the ages of puberty and forty. It is far less communicable than T. circinata, and usually attacks only those who have warm, easily-perspiring skins. Occurring chiefly on the front of the chest and abdomen, on parts covered by flannel garments, it may extend to the upper arm or thigh, rarely affecting the face, scalp or leg, and never developing on the palmar and plantar surfaces. Small, roundish, slightly-reddened patches appear usually symmetrically on the trunk, extending by a slightly raised and somewhat scaly margin. The patch soon becomes pale yellow, fawn-colored, buff, or brownish in color, and unites with neighboring spots, forming irregular areæ with detached roundish patches at the margin. Itching, slight or absent in most cases, may sometimes be severe, and give rise to scratching and pruritic rashes. Occasionally the hair follicles become hyperæmic, giving the patch an irregular, punctated appearance; the pigmentary deposit may be excessive, almost sooty black, the so-called pityriasis nigra; or uticarial or eczematous eruptions may be excited by the parasite. *Diagnosis.*—Tinea versicolor may be mistaken for a macular syphilide, or for ordinary non-parasitic chloasma (melanoderma). The syphilide is usually accompanied by other specific eruptions, is preceded by roseola, sore throat, alopecia, etc., does not usually itch, occurs on the trunk, face, arms, and legs indiscriminately, and is of a brownish or coppery color. T. versicolor, though it may be met with in a syphilitic person, usually occurs per se; the patches frequently itch, occur most frequently on the front of the trunk, and are of a pale-yellow or buff color. Spots of melanoderma are seen most often on exposed parts, rarely on the trunk; they are perfectly smooth, not rough or branny, and itching is not met with. In all doubtful cases the discovery of the parasite (see morbid anatomy), on microscopic examination of the scales, will clear up the diagnosis. *Prognosis.*—In those who perspire freely and do not wash the body the disease is chronic, and may last for years. The parasite, affecting as a rule only the superficial layers of the cuticle, can easily be got rid of by treatment. *Treatment.*—Cleanliness, frequent washing with soft soap, and the subsequent application of sulphurous acid (1 to 4) or hyposulphite of soda lotion (℥ j ad ℥ j), or the inunction of a mild mercurial ointment, easily cure the disease. No internal treatment necessary.

Tinea Favosa—Favus.—Definition.—A contagious, chronic disease, excited by the presence of achorion Schoenleinii in the epidermis, hairs, and corium; met with most frequently on the scalp. *Symptoms.*—Favus, met with rarely in England, is much more common on the Continent, in Scotland, and in some parts of the United States, and, though contagious, attacks chiefly poor and dirty children. It begins on the scalp as an itching, reddish, scaly patch, resembling that of tinea tonsurans, the hairs on which are dull, but not so brittle as in ringworm. Small yellowish crusts, about the size of pins' heads, next appear round isolated hairs, which pull out more easily with their bulbs entire, not broken off; the crusts (favi), convex at first, become, as they gradually enlarge, depressed and cup-shaped in the centre, and of a bright sulphur-yellow color. Solitary favi may enlarge till they measure ½ inch or more in diameter, or may become confluent, and by admixture with epidermis, eczematous secretions, etc., form irregular crusts. The favi have a disagreeable, mousy odor, and when removed leave a depressed pit, which is excoriated or covered with smooth epithelium. In the later stages the typical cups disappear, and the surface resembles a scaly eczema capitis. Destruction of the hair follicles and permanent alopecia are frequent results of the disease. On the body erythematous patches or rings, resembling those a T. circinata, are occasionally met with; they seldom exceed ½ inch in diameter, and have not the tendency to rapid extension seen in ringworm. It is essentially a chronic disease, lasting for many years, and, though contagious, does not seem so easily communicable as ringworm. It is more prone to excite secondary inflammatory affections than ringworm. In America domestic animals (cats, mice, etc.) are said frequently to transmit the disease to man. *Diagnosis.*—Favus, in the early erythematous stage, resembles ringworm, but the hairs are not so brittle, are not stubbly, and pull out with their bulb entire, instead of breaking off sharply. In the developed condition the mousy-smelling sulphur-yellow cups adherent to a hair in their centre are quite typical. In their later stages, when the cups have given way to whitish scales and flakes, or are covered over by impetiginous crusts, the discovery of the fungus under the microscope will distinguish favus from eczema in the scaly or moist and crusting stage. *Prognosis.*—The disease is very chronic, and, on account of its tendency to invade the deeper tissues, resists treatment even more obstinately than ringworm of the hairy parts. Permanent alopecia is frequently caused by it, and some observers believe that it exerts a lowering influence on the general health. *Treatment.*— Epilation, advisable in ringworm, is here almost indispensable. The removal of crusts, blistering, and the application of the mercury and acetic acid paint, followed by hyposulphite of soda lotion or the inunction of ammonia-chloride of mercury, ung. sulph. co., etc., must be persevered in for a long time. Tonics, cod-liver oil, good food, and hygiene are usually necessary.—Malcolm Morris.

TOES may be hypertrophied, be webbed, bifid, or supernumerary.

Hammer-toe.—A condition in which the last phalanx is bent perpendicularly downwards. If necessary, divide subcutaneously, opposite second phalanx, the corresponding digital offset of plantar fascia. Doubtful whether its origin be a nervous contracture or the pressure of tight boots.

TONGUE, Diseases of.—With a view to facilitating diagnosis (a rather difficult task to the student of tongue disease), I shall adhere to the following analytical classification, which starts from the most palpable features of each disease. I. Superficial ulcerations—simple; syphilitic, primary, secondary. II. Deep ulcerations—1 simple, 2, syphilitic, 3 malignant. III. Localized swellings—abscess, innocent tumor (very rare), nævus, gummata, malignant. IV. General swelling—acute inflammation, congenital enlargement, general enlargement secondary to other diseases of tongue or of digestive tract. V. Non ulcerative superficial affections—psoriasis, ichthyosis, papilloma.

Tongue, Simple Superficial Ulcerations of.—*Causes.* Indigestion: irritation of sharp-edged teeth. Occasionally aphthous inflammation. *Diagnosis.*—No induration, or at least no marked degree of it. Ulcers sometimes multiple. Tongue frequently red and glazed. Corresponding sharp edge of tooth may be detected. Signs of indigestion. Pain, frequently, Absence of syphilitic history and of collateral symptoms. *Treatment.*—File sharp teeth. Touch ulcer with silver nitrate. Purgatives. Sodæ bicarb. with infus. calumbæ before meals. The more superficial the ulceration, the more likely is chlorate of potash to be highly useful.

TONGUE SUPERFICIAL SYPHILITIC ULCERATION OF (Secondary or Tertiary).—*Diagnosis.*—Similar ulcerations on sides of mouth or fauces. Perhaps psoriasis also present. No such marked induration as is common in cancer. History and patient's aspect may be syphilitic. *Treatment.*—Antisyphilitic. Locally—gargarisma nigra, hydrarg. c creta, inhaling calomel fumes (5 grains nightly). Internally either pot. iod. or hydrarg, perchlor. For obstinate syphilitic ulcer of tongue, Berkeley Hill recommends a pill of iodoform. gr. 1-2, ext. gentian. gr. 1 1-2, three times a day.

PRIMARY ULCER (CHANCRE) OF TONGUE is not unknown.

TONGUE, SIMPLE DEEP ULCERATION OF.—Very rare *Diagnosis* from cancer and syphilis chiefly by negative signs, especially absence of induration. Tends to heal, unless-phagadænic. *Treatment.*—*Vide* Simple Superficial Ulceration.

TONGUE. DEEP SYPHILITIC ULCERATIONS OF (Tertiary).—*Causes.*—Gummatous abscess, or (rarely) spread or superficial ulcer. *Appearance.*—A deep ulcer or fissure, with abrupt edges, usually towards the center of the tongue, sometimes at the edge, and often with a history of previous tumor or swelling (gumma). Speaking of gummata of the tongue, Morrant Baker says:—"They are usually, but by no means always, multiple, they rarely or never lead to fixation of the tongue, or to salivation, or to very much pain; and they are very tolerant of pressure." In these respects they contrast with cancer. *Treatment.*—Antisyphilitic, especially pot. iod. (gr. x ter die).

TONGUE, MALIGNANT ULCERATION OF, (Epithelioma).—*Causes* as obscure as those of cancer elsewhere. Chronic irritation of sharp teeth doubtless an occasional factor. Clay-pipes. Most frequent in males and in late middle age. Commences as a fissure (rarely as a wart). Syphilitic disease said to sometimes pass into epithelioma. *Diagnosis.*—Distinguish from syphilitic ulceration by (1) hardness of base and edges; (2) absence of collateral signs of syphilis; (3) position—cancer usually begins at side of tongue, deep syphilitic ulcer generally lies near septum; (4) pain is greater in cancer; (5) glands are affected earlier and more extensively, and eventually form a huge, hard mass, in cancer; (6) fixation of tongue from cancerous infiltration; (7) salivation. Unfortunately, in the very cases in which diagnosis is most difficult and most important, the above signs may not be well-marked. Hence the surgeon sometimes has to try anti-syphilitic remedies merely because he does not know whether he has to deal with cancer or syphilis. Tenderness—intolerance of firm pressure distinguishes cancer, and the characteristic hardness is of the same nature as that of scirrhus mammæ, *i. e.*, not like inflammatory induration. *Prognosis.*—Without operation, hopeless. With operation, varies from hope of non-recurrence when a small cancer and a wide margin of apparently healthy tissue is excised, to the certainty of recurrence when the conditions are reversed. *Treatment.*—If diagnosis be doubtful, try large doses pot. iod. (grs. x-xx ter die.) Draw bad teeth. Forbid smoking. Regulate diet. Question of removal depends upon extent of disease. If removal of whole tongue will not suffice to take away all the disease, treatment must be palliative. Removal. By (1) knife, (2) écraseur, (3) galvanic cautery, (4) ligature, (5) Richardson's scissors. Prefer knife for comparatively limited operations: écraseur most popular in extensive ones. Remove disease of anterior part of tongue, and in suitable cases even more extensive disease by operating entirely through mouth. In some instances, the whole tongue could be thus removed, if Sir James Paget's advice be followed—to pass scissors into the mouth and divide the muscles which attach the tongue to the jaw, before pulling forward the tongue. In such an operation the galvanic écraseur, very deliberately used, would be safest, for severe hæmorrhage would here be embarrassing. Various plans have been devised for giving the operator more room to work in, especially (1) Nunneley's, who passes the écraseur chain through a wound in the mylo-hyoid space, and prevents it from slipping forwards by means of hair-lip pins piercing the base of the tongue well behind the disease. (2) Sedillot's, who divides the symphysis of the jaw (in a >-shaped manner to facilitate correct apposition after the operation). Of course the lower lip is divided also. Sedillot's incisions combined with the écraseur form the plan probably most frequently used for extensive cases. An interdental splint might be used in after-treatment of divided jaw. (*See* Lyons, *St. Barth's. Hosp. Reports*, 1878). (3) Submental operation (Regnoli's). Broad arrow-shaped incision in mylo-hyoid space, through which tongue is dragged previous to removal. Protect facial arteries, and secure linguals as soon as divided. (4) T. Smith's—incision of cheek from corner of mouth outwards. (5) Whitehead of Manchester cuts through base of tongue from before backwards slowly with scissors, looking out for the lingual arteries. (*Lancet*, 1880). In all operations on the tongue, a stout whipcord ligature through middle of anterior third, metal retractors, and a simple gag, are required. Also prepare for hæmorrhage. Use Clover's or Mills' method of anæsthesia through a tube. (*Lancet*, vol. i., 1879). *Prognosis.*—Quite good for small operations. Grave for larger ones. Speech returns, perfectly in former, distinct, but sadly modified, in latter. *After treatment.*—Feed through œsophageal tube and by enemas for a few days. Use simple gargles to cleanse mouth. For distressing salivation—alum and pyrethrum gargles. A particularly lengthy, complete, and clear account of operations on tongue is to be found in Erichsen.

TONGUE, ABSCESS.—Very uncommon. *Causes.*—Obstruction of mucous glands? Syphilitic gummata? Foreign body. Make an exploratory puncture to clear up diagnosis.

TONGUE, INNOCENT TUMORS OF.—Very rare. Cysts beneath the tongue are common. Vide Ranula.

TONGUE, NÆVUS OF.—Rare. *Treatment.*—Like that of nævus elsewhere. But if it cause no unpleasant effects, and do not grow, let it alone.

TONGUE, GUMMATA OF.—Seldom seen before stage of ulceration. Vide Deep Syphilitic Ulcer of Tongue (above).

TONGUE, MALIGNANT TUMOR OF.—Vide Malignant Ulceration of Tongue (above).

TONGUE, ACUTE INFLAMMATION OF (Acute Glossitis).—Rare. *Causes.*—Mercurial salivation, iodism, injury, unknown influences. *Symptoms.*—Swelling, often enormous. Pain. Salivation. Danger of suffocation. *Treatment.*—Treat cause. Astringent gargles. Deep, longitudinal dorsal incisions in severe cases. As lower surface of tongue is more extensile than upper, the former tends to present upwards. Bear this in mind while incising (Wormald and Holmes Coote). Support strength.

TONGUE, CONGENITAL ENLARGEMENT OF (Macroglossia).—Very rare. *Treatment.*—Remove V-shaped piece from anterior part of tongue, and bring flaps together. Use écraseur. Remember that children bear hæmorrhage badly. Slight enlargement of tongue is a common sign of constitutional disorder. Treat the cause.

TONGUE, PSORIASIS OF.—Sometimes, but not always, syphilitic. Whitish and dry-looking patches on the tongue, with shallow fissures. Under the microscope, the epithelial layer is found slightly thickened, but the papillæ smaller than normal. The condition should be compared contrasted with that in "chronic superficial glossitis" (Fairlie Clarke), in which, according to Butlin, the papillæ are absent, the surface almost as smooth to the microscope as to the naked eye, the epidermis thinned, but the subepithelial tissue thickened and infiltrated with cells (*Med. Chir. Trans.*, vol. lxi).—C. B. KEETLEY.

TONSILS, Chronic Enlargement of.—Common in scrofulous children, especially in cold, damp climates. *Pathology.*—An hypertrophy of both glandular and fibro-cellular constituents of tonsil, the result of chronic inflammation. *Signs.*—Visible enlargement of tonsil. Peculiar throaty voice. Occasionally, difficulty of breathing. Mouth usually kept open; characteristic expression of face. Deafness. Extra liability to acute and subacute tonsillitis. *Prognosis.*—Considerable enlargement, if coming on before puberty, will often greatly diminish as adult life is approached. But it seldom disappears spontaneously and entirely. *Treatment.*—For severe cases of long standing—excision. Other cases should be treated as pharyngitis, *quod vide.* Excision of tonsil may be effected with a bistoury and vulsellum forceps. In using tonsil guillotine, take care to apply it with the spear or hooks towards the median-line and the ring next the tonsil. Pass the guillotine into the pharynx horizontally, and rotate it to the perpendicular as you place it over the tonsil. In many cases the tonsil can be pushed into the guillotine by the forefinger of the left hand placed outside the neck.

TONSILLITIS, Acute (Quinsy).—*Causes.*—Predisposing are chronic enlargement and depressing influences, *e. g.*, dark, damp residences, defective drainage. Exciting cause, usually catching cold. *Signs.*—Pain on swallowing, a first slight, but gradually increasing in some cases till the act of deglutition inflicts a pain like the stab of a knife. Swelling both internally and externally. The swelling may become so diffuse that the jaws may be scarcely separable. When suppuration takes place, pain usually strikes into ear and becomes throbbing. Fluctuation develops. Foul tongue (owing to oral catarrh); offensive breath; fever—temperature may rise to 104°—and slight delirium for one or two nights not infrequent. *Diagnosis.*—Seldom presents difficulty, except when the mouth will not open. Then, upon looking carefully at the patient, it will be seen that the swelling, however diffuse, has its centre below and beneath the angle of the jaw, is not chiefly in front of and below the ear as in mumps, or over the jaw as in diffuse inflammation commencing near the gums and teeth. Moreover, the voice is generally characteristically gutteral, and the history clear of an acute course commencing in the throat. It is to be remembered that inflammation of the tonsils may be only part of a more serious disease, *e. g.*, scarlatina or diphtheria. *Prognosis.*—Tonsillitis usually attacks those accustomed to it, and who generally know how, by a little care, to check it. But it frequently goes on to suppuration, and in exceptional cases, when very diffuse, causes death by exhaustion or by suffocation. *Treatment.*—Prophylactic is the same as that for catarrhs in general. In addition, do not wear low shirts and collars, especially as regards the night-dress. Wear a light wrapper round the throat when out at night; avoid hot, smothering comforters. Early retirement to bed, with a narrow piece of flannel round neck, will often cut short a sore throat. Gargling, sometimes good, is often more irritating than useful. Best gargles are those of capsicum, of guaiacum, and of chlorate of potash. Give mist. guaiaci, or pot. chlor. *ad libitum* internally When swelling is very great, especially if fluctuation can be felt, puncture tonsil. Use a bistoury wrapped in lint, except towards the point, or a gum-lancet, and direct its edge and point somewhat inwards (*i. e.*, towards median plane of body and away from great vessels). If mouth cannot be opened, patient must simply rest in bed, with a high pillow, in a rather warm, thoroughly dry room, using derivatives, such as hot mustard and water to feet, inhaling the steam of hot water, with a little creosote dropped in it. Hot fomentations may be applied externally, or leeches beneath the angle of the jaw. Do not forget that leech-bites leave scars.—C. B. KEETLEY.

TOOTHACHE* is a pain arising from a lesion, either within or about the region of a tooth.

Causes.—Caries; irritation of the pulp; acute and chronic inflammation of the tooth-pulp; acute and chronic periodontitis; exostosis and necrosis.

Symptoms.—When toothache arises from caries, the pain is of a dull aching character and is treated by the application of creosote, morphia, mastiche, and various anodynes, which are inserted into the cavity of the affected tooth, and then in a few days the carious matter excavated, and metallic fillings placed in the tooth. In irritation of the pulp the pain is the same as in the above affection, but is more prolonged, and is treated in the same manner.

Toothache from Acute Inflammation of the Pulp is recognized by the pain, which is at first confined to the affected tooth, being of a dull, aching character, which soon becomes more intense and lancinating, and appears to spread over the entire side of head and face. Disease is almost always accompanied by caries, and may run on to suppuration and gangrene of the pulp. *Treatment.*—In children the extraction of the offending tooth is generally called for; but, in adults, either application of arsenious acid, one-twentieth of a grain, may be used to hasten the destruction of the diseased pulp, or the constant and renewed applications of carbolic acid on pellets of cotton wood may attain the desired end. The tooth may then be afterwards filled.

Chronic Inflammation is generally the sequel of acute inflammation of the tooth-pulp, and, if the occurrence is frequent, the tooth had better be extracted. The pain is of a dull and gnawing kind.

Acute Periodontitis may arise from a blow, or be the sequel of acute inflammation of the pulp, or may arise from constitutional causes, such as rheumatism or scrofula. Pain commences with a feeling of uneasiness, which increases to an aching, combined with great tenderness on pressure. The tooth is felt long, neighboring teeth become involved, and the inflammation spreads to the palate and cheek, which is swollen and œdematous. Suppuration takes place, pus is formed, and an abscess may burst at any point, either external or internal, to the dental arch. *Treatment.*—If the tooth is far involved in caries, extraction of the offender is the best remedy. When it is desirable that the tooth should be retained, applications of poultices or poppy fomentations are of great benefit, but must be applied inside the mouth only, and about the region of the affected tooth; or local bleeding by leeches, and free incisions, and the prescribing of such constitutional remedies as may be indicated.

Chronic Periosteal Inflammation is generally the sequel of the above disease. The character of pain is the same, but more modified, and the treatment is nearly always extraction of the tooth.

Dental Exostosis is an outgrowth of osseous tissue from the surface of the cementum of the fang. The usual cause of it is chronic periodontitis. The pain is of a neuralgic character. Extraction is the only available remedy.

Necrosis arises when the fang of the tooth becomes denuded of its periosteum, and its most frequent cause is acute periodontitis.—C. B. KEETLEY.

TOPOPHOBIA—*See Fear, Morbid.*

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*Contributed by Mr. I. Lyons, Assistant Dental-Surgeon to St. Bartholomew's Hospital.

TORTICOLLIS—*See Neck, Injuries of.*

TRACHEA, Foreign Bodies in—*See Larynx, Foreign Bodies in.*

TRACHEOTOMY, Indications for.—1. Foreign bodies in trachea or bronchi or pharynx. 2. Scalds of glottis in children. 3. Very advanced and extensive disease of larynx. 4. Croup. 5. Diphtheria in children. 6. As a preliminary step in extensive operations on and about the jaws and throat. In such cases the anæsthetic is usually administered through a tube in the tracheal opening. At the same time, the glottis may be shut off from the lungs by using Trendelenburg's "trachea-tampon," thus preventing any blood from passing down the trachea. *Operation.*—Two chief varieties, viz., (1) high and (2) low, respectively above and below isthmus of thyroid. Latter not usually either necessary or desirable. *Instruments.*—Scalpel, dissecting forceps, artery forceps, bull-dog forceps, metal retractors, blunt hook, sharp tracheotomy hook, canulæ (Fuller's bivalve preferable at first; Baker's rubber tubes may be substituted after a few days). Lawson recommends the bivalve canula without the inner tube. Durham's "lobster-tail" canula less irritating than ordinary metal tube. H. A. Martin, of Boston, U. S., does not use tubes at all. See *Dub. Med. Journ.*, Sept., 1878. Tape to tie canula in place. Sponges, ligatures, gauze, feather, kettle, curtains, &c., the latter for after-treatment. Patient lies on his back; surgeon stands on right side. Pillow beneath neck, head back. Get best light possible. Determine exact median-line by seeing and feeling. Feel lower border of cricoid cartilage. Incise skin from this point downwards two inches. Avoiding anterior jugulars, cut in middle line carefully down to trachea. When thyroid isthmus is recognized it may, if necessary, be hooked down or even divided. When trachea is reached, it can easily be distinctly felt. Now insert sharp hook into trachea, always keeping to median-line. Slightly raise trachea with this hook. It thus becomes defined, and can be incised with confidence. Tracheal opening to be perpendicular, and of size proportional to the patient's and to that of the canula to be used. Always keep to the median-line, and take care that the parts are not displaced laterally by the retractors. In opening trachea, turn edge of knife upwards. *After-treatment.*—Usual practice is to surround bed with curtains, to conduct steam of a kettle by a tube to within the curtains, and to keep the room at a temperature of about 70° Fahr. But some surgeons (*e.g.*, Lawson) are less particular about these points, preferring abundance of fresh air. Over the tracheal wound place a sponge or a fold of gauze. From time to time, when the patient coughs, assist with a feather to clear away mucus or false-membrane. Twice a day, or oftener if necessary, remove inner tube and clean it. Surgeon may occasionally remove and clean outer tube with advantage. This must frequently be done if inner tube is not used. Support strength with abundant liquid food, milk, beef-tea, &c. Of course, when canula has to be kept in any time, it does not prevent return to solid food. Insensitiveness of glottis generally supervenes, and allows part of food to trickle into larynx. *Complications.*—(1) Hæmorrhage, (2) bronchitis and pneumonia, (3) erysipelas.—C. B. KEETLEY.

TRANSFUSION OF BLOOD.—There are two methods of operating —(1) by direct transfusion from arm to arm of blood, (2) by the transfusion of defibrinated blood. For the first operation, the two best methods are—(1) that by Aveling's apparatus, and (2) that by Roussel's. Aveling's apparatus for transfusion consists of an india-rubber tube having a dilatation about its centre and a fine nozzle at either end. One end is passed into the vein of the giver, and when the apparatus is full of blood, or being previously filled with water holding a small quantity of sulphate of soda in solution, the other nozzle is to be inserted into the vein of the patient.

The stream is then propagated onwards by a series of manœuvres that can easily be learned by practice. Roussel's apparatus is more complicated, but is not difficult of application. The giver should have a plump arm with a thin skin, and prominent veins. With this apparatus in the hands of one skilled in its use, transfusion is performed without difficulty.

To transfuse with defibrinated blood, the blood is first drawn into a vessel and whipped till all the fibrin can be removed; the blood is then to be filtered through a fine pocket-handkerchief into a warm vessel and injected into the patient's vein by a proper syringe, that of Dr. Playfair being the simplest and most useful.—Heywood Smith.

TREMOR, Convulsive—*See Convulsive Tremor.*

TREPHINING.—Indications for the operation are given under Head, Injuries of. The operation is occasionally done for cases of epilepsy, in which the surgeon thinks he recognizes signs of localized mischief. And it is likely enough that the labors of Ferrier, Fritz, Hitzig, Duret, and others, together with the development of antiseptic surgery, may lead to further co-operation between the physician and the surgeon in the treatment of cerebral diseases.

Operation.—Scalpel, dissecting forceps, trephine, elevator, piece of quill, sponges, antiseptic dressings, spray, &c. Unless bone is already exposed by a scalp-wound, reflect soft tissues sufficiently by Y-shaped incision. Adjust trephine so that the pin shall project very slightly beyond the teeth. If there be a fracture, place the pin on a firm edge of the bone. In working trephine, take care to press evenly on all sides, lest dura mater be reached on one side before other side of trephine is half through. As dura mater is approached, saw very gently, and frequently probe with the piece of quill. As soon as this detects dura mater on one side, tilt trephine towards other side. When loose enough, remove disc of bone with elevator. Dangers: (1) of wounding dura mater: to be avoided by precautions mentioned above; (2) of wounding a sinus or large arterial branch: to be avoided partly by same precautions, but chiefly by bearing in mind anatomical landmarks.—C. B. Keetley.

TRICHIASIS—*See Eyelids, Diseases of.*

TRICHOREXIS NODOSA.—Trichorexis nodosa consists in the formation of little oval or round swellings on the hairs of the beard and mustache. The little nodes look like nits, but are seen under the microscope to be formed by a localized splitting and bulging of the hair itself, which presents somewhat the appearance of two brooms thrust into one another. No parasite is present, and the condition is ascribed by Beigel, who first described it, to the generation of gas in the medulla bursting the cortical substance of the hair. The affected hairs are not more easily extracted than normal hairs, but they break very readily at the nodes, leaving a frayed, brush-like extremity. The disease is very common and of little consequence. The treatment usually recommended is shaving, though the hairs are apt to split again when allowed to grow.—Malcolm Morris.

TUBERCLE.—A term applied to three substances, which are sometimes, but not always, merely three forms of the same substance, viz., (1) "miliary tubercles"—small, round, transparent or semi-transparent, millet-seed-like nodules, the most usual seats of which are the substance of the lungs and the surface of serous membranes; (2) "cheesy" or "crude" tubercle—dry, opaque, cheesy masses, tending either to soften into purulent, curdy, creamy fluid, or to change to (3) a cretaceous mass. Forms two and three may be results of the metamorphosis of form one. But they may also be due merely to changes in ordinary inflammatory products. I say "ordinary," because it is believed by many that even milia tubercle is sometimes a product of inflammation. That the presence in the system of cheesy masses, the result of inflammation, predisposes in some way to the formation of miliary tubercle, is pretty generally allowed. See Scrofula for treatment, &c.

TUBERCULAR CEREBRAL MENINGITIS.—*Definition.*—Inflammation of the membranes of the brain, attended with or due to a deposit of miliary tubercles.

Causes.—These will include the causes of the diathesis to which the affection is due. Age is an important determining cause: it is rare during the first year of infancy, but is more common during the period extending from the second to the seventh year than any other time of life. From eight to ten it is much less frequent, and from ten to fifteen is rarely seen. In adults it is most common between the ages of seventeen and thirty; from thirty to forty it is rare, and after forty is scarcely ever met with. Sex is another predisposing cause, males being more often the subjects of the disease than females. Bad air, insufficient food, improper clothing, neglect of cleanliness, and a disregard of other sanitary requirements, are exciting causes.

Symptoms.—These may be arranged in four stages: 1. The prodromatic stage; 2, the stage of excitement; 3, the stage of depression; 4, the stage of recurrence.

The symptoms of the first stage may be absent or not noticeable; if well marked and the child is advanced in years, change of disposition is among the first symptoms noted. The temper becomes irritable, caresses are disregarded, and dislike is shown for amusements which formerly gave pleasure. The appetite disappears, and the child loses flesh rapidly, which is especially noticed about the abdomen and limbs. The bowels are generally obstinately constipated, but occasionally there is diarrhœa. Fever is generally present at irregular times of the day. This stage may last only a few days, or may be prolonged for two or three.

The second stage is ushered in by obstinate vomiting; intense pain in the head is a coincident symptom, and so severe that the child puts his hands to his head and cries out or awakes screaming. Convulsions may occur which resemble in general appearance those of ordinary epileptic paroxysms, and may be repeated several times. Very early in this stage the fever becomes more persistent, although it may still be irregular. The pulse, instead of being hard and resisting, is soft and compressible. A sign of very great importance is the cerebral stain, which is found also in simple meningitis, in typhoid fever, and some other affections. If the finger be passed tightly over, the surface of the abdomen, or the thorax, so as to trace a series of lines, in about thirty seconds the skin becomes red, the color being at first diffused, but very soon the lines made by the nail are indicated by a still redder color, which persists a long time. The symptoms of the first stage are rather more marked in the second. The temperature is usually 101° to 103° Fahr. The transmission from the second to the third stage is often marked by an amelioration which may last several days. The characteristic symptoms of the second stage are headache and vomiting.

In the third stage the pulse becomes slow and irregular; it may drop as low as fifty. In infants there is a reduction of the temperature. Strong tendency to somnolence, alternating with quiet delirium; the fingers are kept in almost continual motion, picking up threads from the bedclothes and clutching at imaginary objects. The head is turned restlessly from side to side. Convulsions are present, and may be constant; there is strabismus, convulsive movements of the pupils, and constant motion of the eyeballs. The facial muscles are likewise often affected. In the intervals of wakefulness there is the characteristic "hydrocephalic cry," which is a sound that might be produced by mingled emotions or terror and grief. There is paleness of the countenance, which is succeeded at times by sudden redness, which disappears as rapidly as it comes. General hyperæsthesia, or, instead, anæsthesia of the skin, is often present. The limbs are weak, the gait is staggering, the speech is hesitating. Vomiting ceases in this stage, but constipation persists. The respiration is irregular. This stage may last from two or three days to two weeks.

The characteristic phenomena of the last stage are the return of the fever and the increase in the violence of the symptoms indicative of cerebral disturbance. Paralysis supervenes. Delirium alternates with somnolence, till at last the coma is persistent, and general and spinal sensibility is lost. Before death the pulse rises in frequency, a cold sweat makes its appearance, and the patient dies by a slow process of asphyxia, or in convulsions.

Prognosis.—Unfavorable. The termination of the disease is death.

Treatment.—When we have any reason to suspect an hereditary tendency to tubercular meningitis, prophylactic measures may be used with hope of success. These consist in providing for pure air, ample clothing, nutritious food, and in the administration of cod-liver oil, iron, quinine, and iodine. A climate not subject to sudden vicissitudes, and of such a character as regards warmth and dryness that the patient can spend a great portion of the day in the open air, is also a matter of prime importance. Blisters, antimonial ointment, leeches, and drastic purgatives, which have no other effect than to shorten the life of the patient, should be refrained from. He adds: "In regard to a disease so uniformly fatal as tubercular meningitis, there is not much to say."—WILLIAM A. HAMMOND.

TUBERCULAR PERITONITIS—*See Peritonitis.*

TUBERCULOSIS, Acute Miliary—*See Phthisis, Galloping.*

TUMORS.—*Definition.*—Word "tumor" not always used in same sense. (1) Surgeons sometimes use it loosely, as if synonymous with "swelling of undetermined nature," as *e. g.*, in such a speech as this: "Examine this tumor and tell me whether you think it is an aneurism, or a new growth." (2) The usual meaning of "tumor" is an abnormal swelling in the tissues, which cannot be clearly regarded as mere inflammatory new formation, or as aneurismal dilatation of a single vessel. The margins of this definition are necessarily uncertain, because the limits of the process of inflammation are not quite known.

Causes.—There can be no question but that tumors do frequently arise from continued local irritation, but to what extent hereditary predisposition acts as a predisponent is not yet settled. The very common idea that cancerous tumors are almost as hereditary as Roman noses is certainly wrong. That heredity plays no part in their production is equally incredible. Why, it plays an unquestionable part in the production of wooden legs, because the martial spirit which has exposed his inferior members to shot and shell is often "bequeathed from bleeding sire to son." It would appear from the clinical observations of Sir James Paget, confirmed by the microscopic ones of Mr. Butlin, that the processes of inflammatory new-formation, of ordinary cellular infiltration, may pass, by a gradual commingling, into the process of cancerous infiltration with new cells genetically sprung from epithelium. Often also cancer is seen to attack localities which have long been the seat of syphilitic, of eczematous, or of some other chronic fissure or ulceration. It is possible that new growths may arise from irritation in a quite distant part. They can be removed in that way. I have seen a recurrent tumor over the scapula, which had shrunk gradually to one-eighth its former size during the progress of phthisis and fistula in ano. Such new growths as elephantiasis and brochocele proceed from endemic, perhaps miasmatic influences. It is not impossible that malignant tumors are contagious, though there are no actual clinical proofs of it. Considering how slow most cancers are to infect the sufferer's own system (since early removal often effects a perfect cure), the absence of such proofs is not surprising. Certain localities and certain ages are specially subject to certain tumors; *e. g.*, lower lip of middle-aged, to epithelioma. Sex generally acts in a manner easily explained. For example, it is not difficult to see why men alone should have epithelioma scroti, women alone fibroid of the uterus, and women almost the monopoly of tumors of the breast.

Classification.—Fatty tumor; fibrous tumor; cartilaginous tumor; osseous tumor; myoma; neuroma; vascular tumors; sarcoma; lymphoma, including glioma; recurrent fibroid; fibro-cellular tumor; myxoma, &c.; papilloma; adenoma; cystic tumors; carcinoma.* The carcinomata, with most sarcomata and certain lymphomata, are often classed together as malignant, the rest being termed innocent. Malignancy means simply endowed with a tendency to infect the system. In diagnosing a tumor, the most important question to answer is that of innocent or malignant? In some cases this is the only practical question.

FATTY TUMORS, LIPOMATA.—Two varieties. viz: 1, Circumscribed; 2. Continuous. The common fatty tumor belongs to the former variety. Best example of continuous lipoma is excessive double chin. *Causes.*—Usually unknown. Sometimes follows local irritation. Rarely appears in children or very old people. Continuous lipoma generally begins about age of forty. Female sex most liable. *Anatomy.*—Common fatty tissue surrounded by a fibrous capsule and divided into lobes by fibrous partitions. Sometimes outlying lobes project into the adjacent parts. Fibres connect the capsule with the skin and cause the latter to dimple. *Signs.*—Lipomata are soft, elastic, "pillowy," movable, but causing the skin to dimple as they move. Normally without pain or tenderness, except a little aching from mere weight, and, in a few cases, a little pain, apparently neuralgic. Almost always single. Occasionally multiple. Bulk, unlimited, even up to 50 lbs. avordupois. Multiple fatty tumors rarely grown to more than one inch in diameter. Growth slow. Their loose connections often permit fatty tumors to shift their positions under the influence of gravity. They are liable to cystic, cretaceous, and ulcerative degenerations. *Seat.*—Chiefly trunk and adjacent part of limbs. *Diagnosis.*—When there is no cutaneous dimpling and they are unusually firm, they may be mistaken for cysts, or for fibrous or sarcomatous tumors; but the mistake is of no consequence. *Treatment.*—Let the continuous lipoma alone, unless restricted diet and judicious exercise will benefit it. Or give liq. potass. mm. x ter. die for a long time. Other single fatty tumors should be excised. Cut straight down upon the tumor, or into it if you like, and then dissect or tear it away from its connections. In dressing the wound attend to drainage, and proper adjustment of pressure and support. Multiple fatty tumors should be let alone as a rule. Lipomata are occasionally pendulous; these should simply be cut off.

FIBROUS TUMORS. FIBROMATA.—*Anatomy.*—Fibrous tissue variously arranged, sometimes in interlacing bundles, sometimes in concentric circles Arrangement of fibres may or may not be visible to the naked eye. Sectio whitish or pale red in color. Consistence generally firm and elastic, som times quite soft. Mucous softening, serous infiltration, calcification, eve true ossification not rare. Large cysts may form. Sarcomatous tiss (round or spindle cells) frequently mixed with the fibres,—"fibro-sarc mata." Vascularity usually low. *Seats.*—Usually uterus, bones, nerv cellular tissue near joints, sheaths of tendons, testicles, and ear-lobules. *Characters.*—Rounded or modelled to surrounding parts, smooth, non-lobed, firm, resistant, elastic, generally hard, occasionally soft. Of course degeneration alters their physical properties. Growth slow. Size unlimited. Pain absent. Commence in middle life. Those connected with nerve or bones sometimes commence in the young (after pubery). Number:—periosteal fibromata usually solitary; but uterine and neuromatous fibroids, especially the latter, are more often multiple. *Diagnosis.*—"Consistence, locality, age, mode of attachment and form of the tumor almost always lead to its correct recognition." *Treatment.*—Remove thoroughly. Uterine fibroids require special consideration, and are neither to be rashly interfered with nor supinely let alone. *Recurrence.*—Pure fibroma probably only recurs when excision has been incomplete; but fibro-sarcomata may infect the system.

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* Paget adds: Neuralgic, Pulsating, Floating, and Phantom.

CARTILAGINOUS TUMOR. ENCHONDROMA.—*Anatomy.*—Resembles sometimes hyaline and sometimes fibro-cartilage. But pathologically differs from normal cartilage in three respects, viz.: (1) it is traversed by "capsular-like," communicating connective-tissue meshes; (2) these meshes are usually vascular, while normal cartilage has no vessels; (3) the intercellular substance may be gelatinous or friable. The section cuts gristly and is bluish or yellowish white, or the tumor may be softened or degenerated. *Locality.*—Chiefly the bones: metacarpals and phalanges of hand; femur, pelvis, &c.; parotids, testicles, ovaries, breasts, other glands. Frequently mixed with other tumors. *Age.*—Youth. "The younger the age at which a tumor of bone begins the more it is likely to be cartilaginous, if its general characters agree therewith." (Paget). *Characters.*—Hard, nodular, incompressible, or perhaps very slightly compressible, with a very quick elastic recoil. Rarely soft, but even then very elastic. Rate of growth not characteristic. Size variable. Coincident ossification often occurs and alters character of tumor. *Diagnosis.*—Consider carefully locality, age and rate of growth. *Prognosis.*—Purely cartilaginous tumors are as innocent and non-recurrent as any class of tumors. *Treatment.*—See enchondroma of bones, of parotid gland and of testicle.

OSSEOUS TUMORS. OSTEOMATA.—*See Exostoses.*

MYOMA.—A tumor consisting of muscle cells or fibres. Pure myomata are unknown; but muscular elements, both striped and unstriped, occasionally are found in fibromata.

NEUROMA.—The surgeon often applies this term to any tumor situated on a nerve; the strict pathologist confines it to a tumor consisting mainly of nerve filaments or substance. The latter, so-called "true neuromata," are very rare, most tumors growing on nerves being fibromata, or fibro-sarcomata. Usually multiple, often recurrent. Excision without injury to nerve itself rarely possible. As a rule best let alone. A traumatic neuroma is the bulbous end of a divided nerve. When painful excise.

VASCULAR TUMORS. ANGIOMATA. NÆVI. ERECTILE TUMORS.—*Definition.*—Tumors composed almost exclusively of vessels held together by a slight amount of connective tissue. *Varieties.*—Three: (1) capillary, including common nævi and "port-wine stains;" (2) venous, or cavernous angiomata; (3) arterial, or pulsating erectile tumors; with which may be placed "aneurism by anastomosis." *Etiology*—Many are congenital (especially the first kind). The others usually commence in early childhood, excepting aneurism by anastomosis, which often develops in young people after injuries. *Anatomy*—(1) Capillary angioma consists of a mass of dilated capillaries, arranged in lobuli, each of which corresponds to the blood supply of a single hair or cutaneous gland. The whole mass is of any size, from a pin's head to a sixpence or a penny, or a much larger space, and of varying, though usually trifling thickness. Color from deep red to slaty-blue. But sometimes the skin itself is not involved, and it then may be of normal color. Redness disappears under pressure, so also does part of thickness of tumor when there is any preceptible thickness. Capsule more or less defined. (2) Cavernous angioma consists of an assemblage of spaces filled with blood and resembling dilated veins, or more accurately, the corpus cavernosum penis. In some of the spaces chalky "vein-stones" may be found. (3) Aneurism by anastomosis, or cirsoid aneurism, is a convolution of dilated and elongated arteries. *Signs.*—Port-wine stains and ordinary nævi are easily recognized by their color, and their congenital or early origin. All purely vascular tumors are more or less soft and compressible. The venous ones dilate during forced expiration. The arterial pulsate. *Seats.*—Mostly sub-cutaneous tissue of scalp and trunk. Venous tumors not unfrequently occur more deeply, especially in orbit, tongue, inter-muscular spaces, and even in the liver. *Degeneration,* especially cystic, may occur. *Number* of nævi in an infant often multiple. *Diagnosis.*—Rarely presents any difficulty except in the deeper venous and capillary tumors. These may be confounded with lipomata or cysts; but the possibility of partially or wholly emptying them, and the effect on them of forcible expiration, will often settle the question. *Prognosis.*—If let alone, they will occasionally progress till they cause deformity, weakness, and the absorption even of important parts. But they frequently remain stationary, or may even retrograde. *Treatment.*—1. By injection of tinct. ferri perchlor.; dangerous, especially in nævi of head and neck. 2. By galvano-caustic, benzoline cautery, bulbous nævus cautery, small sticks of lunar caustic driven into tumor. 3. By nitric acid (best for small and superficial nævi). 4. By ligature; various modes, subcutaneous and otherwise. 5. By compression. 6. By excision. Before excision the base of the nævus may be surrounded by an elastic ligature, which should be tightened after pressing the blood out.* Thus the operation is rendered bloodless. Nævi being encapsuled, may be excised exactly like any solid tumor. Balmanno Squire treats port-wine stain by systematic scratchings and cross-scratchings with a hot cautery-needle. Excision is probably the best treatment for aneurism by anastomosis.

SARCOMATA.—This most interesting group of tumors, whose association and nomenclature are mainly due to Virchow, includes the fibro-cellular, the mucous tumor, and the myeloid tumor of English practical surgery; and the group, on the whole, nearly corresponds to Paget's recurrent fibroid. Therapeutic study and pathological study of these tumors have been, unfortunately, very independent of one another; consequently, the varieties of sarcoma have two quite different nomenclatures, one clinical and somewhat old-fashioned, the other scientific and chiefly German. The student has no right to resent this, unless he thinks that science and art should be always manacled together, and one never suffered to advance without the other. First, let us notice chief points in the anatomy of sarcomata, and in doing so, employ a strict pathological classification (after Billroth), viz., into (1) granulation sarcoma; (2) spindle-celled sarcoma; (3) giant-celled sarcoma; (4) stellate sarcoma; (5) alveolar sarcoma; (6) pigmented sarcoma.

Granulation Sarcoma, Round-celled Sarcoma (including *Glioma*), consists of corpuscles like those of lymph. Intercellular substance is homogeneous, striated, or reticulate, varying widely in amount.

Spindle-celled Sarcoma.—Cells acutely spindle-shaped. Intercellular absent or scanty, homogeneous or fibrous. Most recurrent sarcomata contain this tissue; but every spindle-celled sarcoma does not recur.

Giant-celled Sarcoma, Myeloid Tumor.—In addition to the structured elements of one of the other varieties of sarcoma, these tumors contain large cells with many nuclei, and often with many offshoots.

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* W. H. Brown, of Leeds.

Net-celled Sarcoma, Mucous Sarcoma.—This is not exactly the same thing as myxoma. Myxomata are sarcomata of various kinds, but agreeing in having a gelatinous appearance. Net-celled sarcoma contain stellate cells with long processes and gelatinous intercellular substance.

Alveolar Sarcoma.—Very rare; great resemblance fo carcinoma, but the cells are not so easily detached from the mesh-work in which they lie. The cells are large, and usually lie each in a space to itself, "embedded in a fibrous, or more rarely homogeneous, slightly developed intercellular substance of exquisite areolar type" (Billroth).

Pigmentary Sarcoma, Melanotic Sarcoma, Melanoma.—Pigment may occur in any variety of sarcoma. The pigment almost always lies in the cells. All the cells mentioned above as occurring in the different varieties of sarcoma are related genetically to corpuscles of the connective tissues (aveolar tissue, bones, etc.). Consequently, the cells of a sarcoma are united by processes to the intercellular substance. In these two peculiarities, sarcoma is distinguished from carcinoma, the cells of which lie free in the alveoli of the cancer, and are genetically related, not to connective tissue, but to epithelial cells.

Naked-eye appearances of Sarcomata.—These do not correspond very exactly to varieties in the kind of cell found under the microscope. In fact, several forms, *e. g.*, spindle-cell, round cell, and giant-cell, are often found in the same tumor. Some sarcomata and fibro-sarcomata are firm and tense, more or less lobed. On section, they are seen to be intersected with white fibrous bands; and, from the pale yellowish color of the section, an inexperienced observer might readily suppose them to be chiefly fat. They are very succulent and juicy when freshly cut. These are the fibro-cellular tumors. Other sarcomata, especially the "net-celled," are of loose, gelatinous appearance, even so much so as to trickle away on section, like the vitreous humor of the eye. These are the myxomata. Others resemble lean "flesh," and, on section, are seen to be blotched with red, though in the main gray, or yellow and shining. Such often contain giant-cells. Finally, tumors which will recur, or have already recurred, are very often soft, and, with each recurrence, tend to get more and more encephaloid or more and more gelatinous. Sarcomata are liable to cystic, calcareous, osseous, and mucous degenerations.

Symptoms of Sarcomata.—Distinct, encapsulated tumors. Usually rounded and smooth, often lobulated. Consistence varies from great firmness to the softness of jelly. When connected with bone, they frequently ossify. Cicatricial shrinkage very rare (this contrasts with carcinoma). Partial mucous softening and cystic degeneration frequently modify the consistence of a sarcoma. Ulceration occurs early in the course of superficial sarcomata, but is not usually very destructive. The tumor may then fungate.

The chief points for the diagnosis of sarcoma are thus concisely given by Billroth: "Sarcomata develop with peculiar frequency after precedent local irritations, especially after injuries. Cicatrices, also, are not unfrequently the seat of these tumors; black sarcomata may come from irritated moles. Skin, muscles, nerves, bone, periosteum, and, more rarely, glands (among these the mamma most frequently), are the seats of these tumors. Sarcomata are rarest in children, rare between ten and twenty years, most frequent in middle life, and rarer again in old age. According to my observation, men and women are affected with equal frequency. If these tumors be not located in or on nerve-trunks, they are usually painless till they break out. If the sarcoma be in the subcutaneous cellular tissue or in the breast, it may be felt as an encapsulated movable tumor. The growth is sometimes rapid, sometimes slow; the consistence varies, so that it can scarcely be used as a point in diagnosis."

Topography of Sarcoma.—Glioma is connected with the neuroglia of one or other of the nervous parts. It occurs in the eyeball, or attached to one of the cerebral nerves, and is peculiarly a disease of childhood. Myeloid tumors occur in medullary cavity of long bones, but more frequently in lower jaw. When commencing inside a bone, they dilate it to a mere shell at the part affected. In those of the lower extremity, an aneurismal murmur may be often heard. Intraosseous sarcomata contain giant-cells, and are almost always solitary and innocent. But sarcomata which grew from periosteum are malignant, and generally more or less ossified; sometimes they are myxomata. Those sarcomata which originate in muscular interspaces, in fasciæ and in the skin, are almost always spindle-celled and recurrent, but (at all events, in the first place) not infectious. The typical recurrent fibroid is to be found among these.

In glands a mixture of adenoma and sarcoma is more common than pure sarcoma. Cysts often form, and into these sarcomatous tissue may grow (proliferous cysts). Thus are formed sero-cystic sarcomata. Of the glands the female breast and the salivary glands are most liable to sarcomata.

Fibro-cellular Tumors are sometimes myxosarcomata and sometimes merely fibromata of an unusually soft and œdematous nature. Or they may be a combination of both.

Course and Prognosis of Sarcomata.—Some—*e. g.*, most myeloid tumors are solitary, perfectly innocent; recurrence, when it takes place, being probably due to imperfect removal. Others are not less infectious and malignant than encephaloid carcinoma, 1. Those which grow rapidly are soft, and the softer the tumor the worse the prognosis. 2. The more simple and differentiated the character of the microscopic elements of a sarcoma, the more dangerous it is. Recurrent fibroids, with each recurrence, are apt to become softer in consistence and more "embryonic" in microscpic structure. It is strikingly characteristic of sarcoma that it infects the system though the blood-vessels and not through the lymphatics (except in some rare cases quite late in the course of the sarcoma). Contrast this with carcinoma. Different sarcomata present every intermediate grade of infectiousness. Interval between recurrences very variable. Death eventually occurs, in malignant cases either from the disease recurring in a part where operation is impossible, or from infection often embolic of internal organs. Number of secondary sarcomata unlimited. Their favorite internal sites are peritoneum, pleura, and lungs.

Treatment.—Depends to a certain extent on locality; but, as a general rule, prompt excision is indicated. In the case of mammary, subcutaneous, intra-muscular, and osteal or periosteal sarcoma, there need be no hesitation; but adeno-sarcamota of the salivary glands in elderly people are prone to extremely quick recurrence. Excision must be thorough, and include every offset.

Caution.—Small sarcomata are occasionally overlooked when lying near larger ones. Esmarch claims for pot. iod. in large doses a curative power over recurrent fibroid.

Lymphoma.—(1) Idiopathic disease of the lymphatic glands, or (2) a tumor resembling a mass of lymphatic cells with a stroma of adenoid tissue but not situated in the site of any normal lymphatic gland. As microscopically, almost all affections of lymphatic glands are indistinguishable, and as so-called "lymphomata" present every grade, from innocency up to intense malignancy, it is obvious that milder cases cannot be separated from mere secondary glandular inflammations or from scrofula. Indeed lymphomata, as a class, have been termed "scrofulous sarcoma." But surgeons are generally agreed in setting apart from other glandular diseases, cases like the following. (1) One or more glands, in the neck usually, enlarge and resist treatment. Obstinate anæmia comes on. Suffocation by mechanical pressure may cause death; or the progressive anæmia—frequently with leucocythemia proves fatal. Occasionally the disease is arrested by antiscrofulous treatment or even spontaneously. Various glands in the other parts of the body, often enlarge also. (2) Glands enlarge quickly to soft "medullary tumors," the lymph-corpuscles simultaneously infiltrating the neighboring tissues. Anæmia and marasmus come on and advance rapidly to a fatal result. Excision is followed by recurrence. Systematic infection may take place. Prognosis is almost hopeless.

Anatomy of lymphoma.—All the cellular elements of the gland are multiplied and enlarged; "the structure of the gland is gradually lost entirely; the whole organ becomes a mass of lymph-cells, although a fine network is generally preserved." "The blood-vessels are preserved and their walls greatly thickened. *Treatment.*—At first try anti-strumous remedies, cod-liver oil, iron, &c. Iodine injections, electrolysis, and compression appear to succeed occasionally, but rarely. Excision may be performed when the glands are distinct and are causing local trouble. Billroth treats malignant lymphoma successfully with arsenic, liquor arsenicalis, tinct. ferri. aa m. v. bis die. Increase by one drop every second or third day till symptoms of poisoning appear. Then diminish by one drop every second day.* See *Allgemeine Med. Cent. Zeit.*, May 16, 1877.

Papillomata.—Include warts and horny excrescences. Palpillomata are formed of hypertrophied cutaneous papillæ, covered by hypertrophied epidermis. Warts usually show each papilla, with its thickened epidermal covering, distinct to the naked eye. The ordinary wart is too well known to need description, but there is a disease described by Mr. Erasmus Wilson as verruca confluens, in which a considerable area of skin becomes the seat of a warty growth. Syphilitic and gonorrhœal condylomata are more like hypertrophied granulation tissue than like true papillomata. *Causes.*—Unknown. Much more common before than after puberty. Irritating fluids, such as the hands of the post-mortem clerk are exposed to, often cause a warty state of the skin. *Treatment.*—Shave off the non-vascular summit and apply some caustic. Nitrate of silver, strong nitric acid, glacial acetic acid, acid nitrate of mercury. Milder applications may suffice, *e.g.*, strong tinct. ferri perchlor. For gonorhœal warts, try powdered sulphate of copper, and for syphilitic, calomel, with oxide of zinc. Dr. Verco has observed a severe crop of common warts disappear rapidly during a sea-voyage. Horny excrescences in man are epidermal in structure with a papillomatous base. *Treatment.*—Shave off and thoroughly cauterize base or excise base. Some radical operation quite necessary, or they grow again, and may become starting-point of epithelioma.

Adenomata.—*Partial Glandular Hypertrophy.*—Tumors containing some proportion of glandular structure. This is usually mixed with some other tissue, and the relative proportions vary much. Thus are produced adeno-fibroma, adeno-sarcoma, etc. Microscopically, they are characterized by the presence of tissue resembling tubular, and sometimes racemose glands. By great dilatation of the tubules, cysts may be formed. In shape the tumors are usually round or oval, and lobed; but their other physical characteristics depend greatly upon the kind of tissue which accompanies the adenomatous—*e. g.*, an adeno-myxoma would be very soft, an adeno-chondroma usually very hard. Any innocent, smooth, round, lobed, and elastic tumor situated in the breast, or in the parotid, is very likely to be, at all events partially, adenomatous. Billroth says that he considers true adenoma of the breast to be very rare, the glandular tissue found in mammary sarcomata being merely part of the original acini of the organ. Nasal, uterine, and rectal polypi are often partial adenomata; solid or semi-solid bronchoceles are adenomata. *Treatment.*—Pedunculated adenomata can be removed by polypus forceps, by ligature, by ecraseur, or by scissors, or by combinations of ligature and scissors. See Polypus of Nose, of Rectum, and of Ear. For treatment of thyroid and mammary adenomata, see Bronchocele and Breast respectively. It may be shortly stated that excision is the usual treatment, but that no tumors are so frequently cured spontaneously, or without operation, as adenomata.

CYSTIC TUMORS, CYSTOMATA, CYSTS.—*Definition.*—"A tumor formed by a sac filled with fluid or pulp." *Varieties.*—The names of cysts have been given on principles nearly as various as those on which human beings have been named. Thus we have:—I. (1) Simple, (2) compound cysts. II. (1) Extravasation, (2) exudation, and (3) retention cysts. III. (1) Serous, (2) synovial, (3) mucous, (4) blood, (5) sebaceous, and (6) proliferous cysts. IV. Congenital cysts. The four classifications being based respectively on number, on mode of origin, on contents, and on period of origin. (Proliferous cysts are those which contain growths within them. They are practically identical with "compound cysts." All other cysts are "simple.") *Causes.*—Extravasation cysts are due to extravasation of blood. They are usually traumatic. See Hæmatoma. Exudation cysts, at least such as are ordinarily regarded as tumors, are of unknown origin, except such as arise from local irritation. Retention cysts are due to obstruction of the orifice of some gland causing dilatation behind it. It ought to be noted that the class exudation cysts is by Virchow considered to include such serous dropsies as hydrocele, ganglion, and hydrarthrosis; while "retention cysts" include even dropsy of the gall-bladder, dilatation of the Fallopian tubes, and so on. We shall now consider the anatomy, diagnosis, prognosis, and treatment of each variety of cysts separately.

SEROUS CYSTS.—*Seats.*—Most commonly in or near glands, kidneys, thyroid, breast, sublingual, &c. When in the neck they are called "hydrocele of the neck." They may occur almost anywhere and in any tissue. *Contents.*—Fluid usually thin, but sometimes honey-like, usually yellow and clear, but may be dark even to blackness. Walls of connective tissue lined with tesselated epithelium. Number, various. Growth is usually slow. *Diagnosis.*—Not difficult when the fluid is thin and the cyst not tensely filled; but a very tense cyst may be mistaken for a solid growth. The practised touch usually suffices to distinguish the fluctuation of a cyst from the elasticity of an adenoma, a fibro-cellular, or other soft tumor. The latter are more likely to be lobed, and possess various special characters described above. Abscesses may be recognized by the history, by considering locality, age, pain, &c. It is not often very important to make a diagnosis before puncturing. *Treatment*—Puncture with trocar and canula, followed by pressure. Iodide injections. See Bronchocele. Drainage: in large cysts, antiseptic precautions to be taken. Cauterizing interior. Free incision. Excision. Multiple cysts may require excision of a whole affected gland. When the cyst is not complicated with some recurrent, solid growth, and when operations on it are performed with due care, prognosis is most favorable.

MUCOUS CYSTS.—Type, ranula, q. v.

BLOOD CYSTS, SANGUINEOUS CYSTS.—Are either serous cysts into which hæmorrhage has occurred, or else hæmatomata. Treat on the same principles as serous cysts, and hæmatocle of the tunica vaginalis. Blood cysts frequently occur in malignant tumors, in which they are of course, of quite secondary importance.

CUTANEOUS CYSTS.—Under this head may be considered sebaceous and congenital cutaneous cysts.

SEBACEOUS CYSTS are of two kinds, one of which shows the punctiform vestige of the orifice of the follicle by whose obstruction the cyst has been produced, whilst the other does not. The vestige above-mentioned is a dark point which can usually be found. *Locality.*—Anywhere, but especially head and face. Walls usually soft connective tissue. *Contents.*—White, pulpy, epidermal matter, mixed with crystals of cholesterine, often offensively smelling. Color occasionally brownish, consistence sometimes very soft. Shape round, smooth, often changeable by pressure. Growth slow. Age of first appearance, before middle age; but the surgeon is not usually consulted about them at first. They have to be diagnosed from chronic abscess and other soft innocent tumors. Note the character mentioned above. Locality, history, absence of quick elasticity, and presence of the black point are important.

CONGENITAL CUTANEOUS CYSTS.—*Locality.*—In or near orbit, often deepseated. May extend through aperture in bone, even into cranial cavity. Walls very thin. Contents usually turbid, oily fluid. Size small (half an inch). *Diagnosis.*—From nævus, lipoma, and from serous cyst. Congenital cutaneous (dermoid) cysts occur also in other parts of face and neck, but always in the lines of the branchial clefts. Hence their possible origin from the accidental enclosure of dermal tissue when these clefts closed. (Verneuil. See Wagstaffe, Path Trans., 1879). Congenital dermoid cysts of the head sometimes perforate the cranium, and then may be confounded with meningocele or encephalocele. This is not so serious a mistake as the converse. See Meningocele. *Treatment of the Cutaneous Cysts.*—1, Dilate the black punctiform opening with a probe, and squeeze out contents. Repeatedly squeeze out if they reform till the sac has time to obliterate itself. 2. Cauterize (to the size of a sixpence) with potash or strong nitric acid. Afterwards pull cyst out through the opening. 3. Incise skin over tumor, seize with forceps, and dissect out. Operation easy unless inflammation has taken place.

COMPOUND CYSTS. PROLIFEROUS CYSTS.—*Definition.*—Cystic tumor containing growths. When these growths are themselves cystic, the tumor is called a cystigerous cyst. But the growths are usually solid. Excellent examples of cystigerous cyst are furnished by many ovarian tumors.

NOTE.—Many cysts clustered together do not in themselves constitute a compound, but a multiple cystic tumor.

Anatomy of Proliferous Cysts.—The solid intra-cystic growths appear to grow from one point in the wall of the containing cyst. They gradually fill up the containing cyst, displacing the fluid which previously occupied it. Sometimes cysts and their contents cohere altogether, so that only the appearance of a section indicates that the tumor has ever been cystic at all. The nature of the intra-cystic growth is usually sarcomatous or adeno-sarcomatous. Their physical characters are as various as possible, flat or arborescent, soft or hard, pale or dark red. And they may be themselves cystigerous. *Diagnosis.*—Locality almost always some gland—breast, thyroid, etc. Their general characters resemble so closely those of adenoma and fibro-cellular tumor, that unless palpation discovers evidence of fluid in some parts, and of solid in others, diagnosis will probably be impossible. Skin quite healthy unless the tumor fungates. Age—most commonly between thirty and forty. The chief practical indication is to distinguish them from cancer. This is done on the general principles by which other innocent tumors are thus distinguished.—*Prognosis.*—Usually favorable. Prospect of recurrence if the whole tumor be not removed, or if the solid part of the tumor be soft and sarcomatous. *Treatment.*—Thorough excision.

CARCINOMATOUS TUMORS.—See Cancer.—C. B. KEETLEY.

TUSSIS CONVULSIVA—*See Hooping Cough.*

TYLOSIS—*See Corn.*

TYPHOID FEVER—*See Enteric Fever.*

TYPHUS, Abdominal —*See Enteric Fever.*

TYPHUS BUBONICUS—*See Plague.*

TYPHUS FEVER—*Definition*—Typhus is an acute infectious disease characterized by the production of a mottled rash, which becomes petechial, and which is accompanied by considerable constitutional disturbance.

Symptoms.—Thirteen or fourteen days after the reception of typhus poison there is a sense of chilliness and headache, accompanied occasionally by vomiting, and general pyrexial symptoms. On the third day, more often on the fourth or fifth, the mulberry rash of typhus makes its appearance. The rash can be described as consisting of two parts. The one which is simply an indistinct dark mottling appears as if it were a little distance beneath the surface of the skin, and is described as the "subcuticular" mottling. The other consists of a quantity of small purple maculæ scattered over the surface of the skin, and appear to be altogether on the surface. When they first appear they are very slightly raised, but in a few hours become perfectly flat. The subcuticular mottling may exist by itself, but the maculæ are usually present as well. The rash is fully developed in less than forty-eight hours from its commencement, and no rash is ever produced after this period. For the first few days the spots fade on pressure, but later on a yellow stain is left, and still later pressure produces no effect on the spot, which has then become petechial; the petechiæ remain, appearing like minute hæmorrhages, and often last as long as three weeks, but the mottling disappears earlier. The rash appears first on the wrist, upper part and sides of abdomen, and about the edges of the axillæ; later it gradually extends over the whole abdomen and chest. The constitutional symptoms steadily increase, especially the delirium, which is often of a violent character. The tongue, which is first coated with white fur, becomes dry, brown, and sometimes black, and great difficulty is experienced in protruding it, on account of sordes collected about the mouth. Later the tongue begins to moisten at the edges, and the appetite rapidly returns, even before the tongue is clean. During the whole course of disease the temperature is raised constantly to 104° to 105° Fahr. The maximum temperature is usually reached on the fourth day, when a slight fall takes place; a further fall occurs about the seventh day, and although at the beginning of the second week it is slightly lower than during the first, it rises until the crisis occurs. This takes place generally between the twelfth and seventeenth days. The temperature then falls rapidly, and becomes normal within three or four days of the crisis, unless some complication be present.

Occasionally erysipelas and glandular swellings, especially of the parotid, occur during the course of the fever.

Diagnosis.—Typhus is frequently mistaken for brain disease, pneumonia, measles, and enteric fever. In the first two it is only necessary to point out that no rash exists; from measles, however, the diagnosis is not always an easy matter. In both the rashes appear on the same day, but differ in certain essential particulars (see table).

TYPHUS.	MEASLES.
Rash not very often present on the face.	Rash commonly present on face.
Maculæ smaller than measles, separate from each other, and not raised.	Maculæ often coalesce and are raised.
Subcuticular mottling present.	Subcuticular mottling not present.
Suffusion of eyes, but no coryza.	Coryza.

The diagnosis of typhus from enteric fever is a perfectly easy matter, and a mistake should never be made between these two diseases (see table.)

TYPHUS.	ENTERIC.
Commences suddenly.	**Commences insidiously.**
Rash on fourth or fifth day.	**Rash at end of first week.**
Dark, mottled, non-elevated rash.	**Group of lenticular roseolous papules.**
Rash fully developed in forty-eight hours.	**Rash appears in successive crops, each spot lasting two or three days.**
Rash becomes petechial.	**No petechiæ.**
Diarrhœa less common than in enteric.	**Diarrhœa common.**
Flat abdomen.	**Full, tender abdomen.**
Heavy, dull expression of face.	**Flushed cheeks, glistening eye.**

Prognosis.—The chances of recovery depend altogether upon age. The young nearly always recover; while among those of middle or advanced life the mortality is very high. Fat, heavy persons are more likely to die than those who are more spare. A large amount of rash, which soon becomes petechial, especially if it be of a dark color, an absence of fall of temperature at some period during the first week, a sudden rise of temperture during the third week, and very rapid pulse, much delirium, coma, convulsions, and suppression of urine, are all unfavorable signs.

Treatment.—This should be regulated on general principles.—MALCOLM MORRIS.

TYPHUS, Cerebral—*See Cerebro-Spinal Fever.*

TYPHUS, Gravissimus
TYPHUS, Pestilentialis } —*See Plague.*

TYPHLITIS—*See Enteritis.*

ULCERATION.—The following brief account of ulcers and their treatment has been contributed by Mr. Edmund Owen :

An ulcer is well defined as being a solution of continuity with loss of substance. The common cause of ulceration of the skin is suppuration in the dermal connective tissue. The collecting pus, in its escape to the surface, destroys the superimposed dermal layer, and the epidermis, being thus deprived of its nutritive supply, dies and is shed.

Now, whatever conditions interfere with the nutrition of the skin necessarly predispose to the formation of ulcers. Thus, when the function of the veins of the leg becomes impaired from a failure of the valves to check the downward fall of the blood, stagnation in, or rather congestion of, the cutaneous capillaries results, and from the distended vessels the serum oozes, so that the tissues become œdematous, pitting on pressure.

In this sodden and unhealthy skin a comparatively slight irritation, or trivial injury, is frequently attended by lesions, troublesome out of all proportion. And thus the chafing of a badly-fitting boot, or the fretting of a dirty or rough stocking, or a knock against a stair, may determine the formation of an ulcer, which will presistently refuse to yield to ordinary therapeutic measures.

As a rule varicose ulcers are associated with eczema, an attack of eczema often preceding and determing their onset.

Common-sense, with a little practice will soon enable the student to select with great promptness the adjectives best describing the varicose ulcer, but the term "chronic" only too often denotes its chief characteristic.

The following is a list of the different kinds of ulcers usually met with:

The healthy ulcer, which is circular and is generally covered by a little thick pus; the granulations red and even with the surface of the part; the edge of the sore is covered by a slightly depressed, bluish-white film of new epidermis, which gradually loses itself in sound tissue. The treatment, whatever it may be, is evidently well chosen, for the sore is healing.

The weak ulcer is covered by large and pale granulations, which are heaped up on the surface, but are painless. The local treatment best adapted will be rest, aided by the pressure of a pad of dry lint and a bandage or strapping. Stimulating lotions may be of use, also resinous and other ointments. A change of application is often attended with such good results that the weak ulcer is converted into one of the preceding class.

The indolent ulcer is gray and glazed, and is surrounded by an unyielding mass of tissue, which has been rendered thick and discolored from long-continued congestion. The discharge is thin, and often of a most foul odor.

Blistering fluid applied around the margin may sometimes effect much good by causing absorption of plastic deposit, but the poor and ill-fed can rarely submit to such treatment as out-patients. With in-patients two semi-elliptical incisions on the side of the sore will relieve much tension and promote a healthy condition.

The inflamed ulcer is recognized by placing over it, but not in contact with its raw and painful surface, the palm of the hand. The parts around are livid, hot, and tense. Poulticing affords great relief by diminishing the heat and pain.

The phagedænic or gangrenous ulcer is, as the former term applies, a sore which extends by eating its way into the neighboring skin. It shows no attempt at healing; on the contrary, the discharge is thin and bloody, and the surrounding parts are livid and swollen.

Opium given internally with quinine and acid, poultices and cleansing lotions, and the hot leg-bath will be required.

The irritable ulcer is to be distinguished from the inflamed ulcer by the absence of heat when the hand is held over it, as well as by the watery nature of the fluid thrown off from its surface. It is exceedingly painful, and its essential pathological character depends, according to Hilton, on the exposure of a nerve upon its surface. The exquisitely tender spot is to be made out by searching over the granulations with a probe; the treatment will consist in the division of the twig above the spot indicated by the examination. Opium and tonics may be required.

Although the leg and ankle are the most frequent seats of ulcers, on account of the unfavorable influence with which the force of gravity continually acts upon the venous blood, still it is hardly necessary to remark that there may be other than varicose ulcers even on the surface of the lower extremity. Any part of the body may be the seat of an ulceration which is the result of the destructive influence of neoplastic deposits. Thus are begotten the tubercular, the lupoid, and the syphilitic ulcers.

But to give a description of all these varieties of sore would be to write an essay on pathology which, in the small space which can be devoted to the subject, is manifestly impossible. So we must content ourselves by concluding with a few general remarks which may be found of service to the student in his early practice.

First, then, when ulcers are found in regions where one is not accustomed to see them, as upon the knee, calf, thigh, trunk, arm, or face, they are not unfrequently of syphilitic origin.

Of course the integument of these areas may be attacked by ulcers which are not the result of syphilis. But if the sores are multiple, clean-cut, with rounded or crescentic margins, and appearing in successive crops, there is quite enough to justify the suspicion of the student, and even, it may be, to induce him to commence the treatment of the patient with the internal administration of iodide of potassium in full doses. But we will venture here to offer him two cautions,—firstly, not to place too much faith in what is known as a "coppery stain" about an ulcer; and, secondly, not to conclude that, because an ulcer has healed whilst the iodide is being taken, therefore the sore was the result of a breaking down of a deposit left as the result of syphilitic infection.

A last word concerning the treatment of those numberless ulcers which are the result of dilated veins. They occur chiefly in laundresses, ironers, hostlers, and others who stand much during the day, and who drink freely, whether of tea or beer. Rest is more easily enjoined than enforced; but the amount of vascular fulness may be diminished by regulating the amount of fluid absorbed. The veins require support; but this cannot often be obtained in the shape of the costly elastic stocking, nor, if there be eczema present, could that useful aid be tolerated, for the moisture from the vesicular eruption would soon render the webbing hard, irritating and worse than useless.

Martin's India-rubber bandages are useful in some cases, but their application requires more care and manipulative skill than these patients usually possess, whilst their cost often puts them beyond the reach of most of these sufferers. Considerable success may be obtained by applying a piece of strapping firmly, but not too tightly, around the limb, above the ulcer and below the dilated veins, leaving the sore exposed for the application of lotions or ointments. Theory might perhaps suggest that such a method of treatment is unscientific, as it would offer another barrier to the easy return of the venous stream. But practice shows that the strapping so applied generally affords the greatest comfort by cutting off the weight of the downward-pressing column of venous blood, in the same way that the application of a truss affords relief in a bad case of varicocele. The strapping is best applied by the patient before he gets out of bed in the morning; its use may be dispensed with at night. In some cases of varicose eczema also the wearing of a garter below the knee affords great relief.—MALCOLM MORRIS.

ULCER, Rodent—*See Rodent Ulcer.*

ULCERS—*See Ulceration.*

ULNA, Fracture of—*See Fractures.*

URETHRA, Calculus in—*See Calculus.*

URETHRA, Female, Vascular Growth of the.—*Definition.*—A brilliant red excrescence from the canal of the urethra, usually the posterior aspect, or from the posterior margin of the orifice; occasionally hidden in the urethral orifice.

Causes.—Unknown.

Symptoms.—Extreme tenderness and dysuria, the pain lasting only during micturition; dyspareunia.

Signs.—The growth is easily seen protruding from the urethra. If it is some little way up the urethra, the passage of a sound will reveal it by the exquisite pain caused.

Diagnosis.—From vegetating cancer by the smoothness of its surface; from syphilitic warts by the latter existing elsewhere also, and being less painful.

Prognosis.—Favorable.

Treatment.—The growth must be carefully seized with a pair of fine forceps, care being taken not to tear it, and then freely excised with a fine pair of scissors, and the actual cautery applied; or the growth may be removed by the cautery knife.—HEYWOOD SMITH.

URETHRA, Stricture of.—*Classification:* (1) spasmodic, (2) inflammatory, (3) organic. Organic are:—A. Of neoplastic origin: (1) annular, (2) indurated annular, (3) diffuse or tortuous, (4) bridle, (5) caruncle, (6) traumatic; B. Of heteroplastic origin, epithelioma, &c.

Causes.—*Of Spasmodic Stricture:* almost always an organic predisposing cause situated within the urethra. Dyspepsia or gouty diathesis with consequent acid state of the urine. Irritating diuretics, *e. g.*, cantharides. Some foreign body; *e. g.*, passage of a bougie or of a minute calculus. Some disorder of the central nervous system. *Of Inflammatory Stricture:* exercise, excitement, alcoholic or other excess during course of a gonorrhœa. *Of Organic Stricture:* the great majority arise from gonorrhœa, especially chronic gonorrhœa or gleet. Some follow non-specific urethritis. *Vide* causes of urethritis. Traumatic strictures follow rupture of the urethra. Hot climates. Abuse of alcoholic drinks, especially malt liquors. Neglect of proper treatment in gonorrhœa. Caustics. Syphilitic ulceration of meatus.

Position.—Spasmodic stricture occurs in various parts of the urethra. Inflammatory stricture is due to acute inflammation of the prostatic part. Of organic strictures, two-thirds are in the bulbous part of the urethra, *i. e.*, in the posterior inch of the spongy part (Thompson). This is denied by Otis, who says that strictures are most common in the penile part of the urethra. For confirmatory observations, see Lockwood, St. Barth.'s Hosp. Rep., 1879.

Signs.—Earliest symptom is usually a slight gleet; (almost all obstinate gleets are said to be caused by stricture). Sometimes retention is the first sign of all. Altered sign and shape of stream—small, twisted, spirting, forked or even divided. A few drops of urine trickle away after micturition has apparently been completed. Commencement of the act of urination difficult and slow, act itself prolonged. *Advanced Symptoms.*—Constant desire to make water. Night's rest broken. Straining. Sense of heat, soreness, and smarting about neck of bladder, "greatly aggravated by an excess of acid in the urine, by cold, or imprudence of any kind telling on the parts." Pain in pubic region, in perineum, back and loins. Pain during coition. Semen may recoil back into bladder. In some stricture-cases a discharge like that of gonorrhœa may follow sexual intercourse. Anus shows effects of straining—prolapsus and hæmorrhoids. In a few cases almost the only marked symptom is the liabilty of attacks of retention.

Urine tends to become alkaline and ammoniacal.

$$COH_4N_2+H_2O=CO_2+_2NH_3$$

urea+water=carbonic acid+ammonia, is the reaction which represents transformation of urea into carbonate of ammonia. This ammonia irritates the bladder, causing cystitis. The urine contains also triple phosphates in abundance, as well as pus and mucus, owing to the cystitis. Occasional hæmaturia, from rupture of vessels near stricture during erection of penis.

Complications.—1. Dilatation of urinary passages and organs posterior to stricture—prostatic part of urethra, bladder, ureters, kidneys. 2. Atony and absorption of same structures; kidney may suffer great atrophy of its substance. 3. Inflammations and suppurations of the same parts, especially of bladder and kidneys. 4. Incontinence of urine. 5. Rupture of the urethra or bladder, and extravasation of urine. 6. Chronic abscess and fistula. 7. Constitutional effects. For most of the above complications, see notices elsewhere, *e. g.*, bladder, diseases of kidney, urine, &c.

Constitutional Effects.—Loss of strength. Impaired digestion. Thinness. Careworn look. Irritability. Despondency. Pains in back and loins. Feverishness of intermittent character. Urethral fever may be excited by the passage of a bougie, especially if the instrument be comparatively large. When there is organic kidney-disease, catheterism almost always causes severe rigors. Then death may also ensue suddenly, perhaps from poisoning by urea.

Diagnosis is usually settled by passing instruments. History of case may help to demonstrate nature and cause of the stricture. Act of micturition should be observed.

Prognosis.—Very good if stricture be treated early. Serious, if neglect has allowed kidney disease to supervene.

Treatment.—The immediate treatment of strictures (whether inflammatory, spasmodic, or organic) in which there is retention of urine will be considered under the head Urine, Retention of. Treatment of strictures in which there is no urgent retention. Varieties may be classed as follows: (1) dilatation, (2) rupture, (3) urethrotomy. These three classes include at least eight methods, viz.: (1) intermittent dilatation, (2) continuous dilatation, (3) vital dilatation, (4) rupture, (5) dilatation from behind—Jordan's operation, (6) internal urethrotomy, (7) external urethrotomy, (8) perineal section.* 1. Dilatation.—Instruments: silver, gum-elastic (English), or French catheters or bougies. The soft French instruments are preferred to silver ones by the majority of people accustomed to both. Sir Henry Thompson strongly recommends them. The English gum-elastic has the advantage that it can be moulded to any curve in warm water, and stiffened in the new curve by plunging it into cold water. Silver catheters permit their points to be directed with greater precision than soft ones. The advantage of using a catheter instead of a bougie, is only that the former instrument, by giving passage to urine, tells you when it has entered the bladder. French instruments usually taper near the end, but have the end itself nobbed to prevent catching in the urethral lacunæ. Hence the name "bougie à boule." The French sizes No. 3 to No. 21 correspond nearly to our No. 1 to No. 12: the number of each size of the former scale representing the number of millimetres in its circumference. Catgut and whalebone bougies are also used for very narrow strictures.

Rules for Ordinary Catheterism.—1. Patient may stand upright with his back against the wall; but as he may faint, it is safer for him to lie down on his back. 2. Stand on patient's right if he is lying down. Sit in front of him if he is upright. In difficult cases bring the patient to the foot of the bed, and stand between his legs. 3. See that your catheter is clean and not blocked up. 4. Warm it slightly. 5. Oil it well. 6. Steady the penis with your left finger and thumb, and, holding the instrument lightly between the thumb and two fingers of your right hand, pass its point five inches down the urethra, that is as far as it will easily go while the instrument is in its present position (that is to say, with its handle parallel to the patient's left groin). 7. Bring the handle up to the middle line of the abdomen, keeping the point of the catheter well down the urethra. 8. Lightly depress the handle, at the same time pushing the point onwards round the sub-pubic curve into the bladder, employing only the slightest degree of force with the lightest hand possible. By "depress the handle" is meant "bring it downwards, from the linea alba towards the interval between the thighs." When in the bladder, the catheter should be parallel with the thighs, or nearly so. Difficulties. (1) point may entangle in lacunæ, in roof of urethra, or in a false passage; (2) or may be obstructed by the anterior layer of the triangular ligament, through which the urethra passes about six inches from the meatus; (3) or by spasm; (4) or by an elevation near prostate or neck of bladder. At first keep the point on the floor of the urethra. Always be patient and gentle. Force can do no good, and may cause much harm, especially false passages, hæmorrhage, and pain. Gum-elastic catheter; be very careful to preserve its carve. When you have got the point well down the urethra, depress the handle rather suddenly, but still with a light hand. French soft instruments: simply push them gently on into the bladder.

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* To these should be added dilatation by Wakley's tubes, which glide one over the other, and the smallest over a small silver catheter.

Indications for treatment of stricture: (1) to restore normal size of urethra (or to dilate as much as is consistent with safety and comfort); (2) to maintain the ground gained. At the first examination of a case of supposed stricture—1. Pass, or try to pass, a medium-sized instrument. If it passes very easily, try a larger and a larger, till you find the largest which passes without much pain. Note the size and position of the stricture. 2. If it will not pass let the patient make water, if he can. The size of the stream will usually be a little larger than the diameter of the stricture. 3. If he cannot make any stream of water, carefully examine hypogastrium, to see if bladder be distended. A finger in the rectum to palpate base of bladder may assist in this examination. 4. If you have seen a stream of water, take an instrument a little smaller than that stream, and try to pass it. 5. But if there is no stream of urine, or if the instrument advised in last paragraph (4) have failed, try the smallest soft French catheter you possess. 6. If this fails, try your finest bougie or catgut or Thompson's probe-pointed catheter, or Maisonneuve's conducting bougie (if you possess them). Each instrument should have a fair and patient trial. Use plenty of good sweet oil. Sir H. Thompson directs it to be injected into the urethra. Another plan is to inject it in steadily at the very same time that you are gently pushing on your fine bougie. The stream of oil, entering the stricture, may carry the point of the bougie with it. 7. If the stricture resist all this, put the patient to bed, and if there is no immediate retention, reserve him to be treated as a difficult case. In the meantime, tincture of opium, hot baths, and rest in bed may bring his stricture to a state of easy permeability.

Dilatation, according to the ordinary plan, is thus managed. An instrument as large as the patient can comfortably endure is passed the first day. Then, at intervals of about two days, more or less according to the patient's urethral sensibility, a larger and a larger size are passed, till No. 14 (English) is reached. Modern opinion is opposed to resting content with No. 12. If any attempt is made to hurry the steps of this treatment., the severest rigors and urethral fever may result. Some cases show similar serious symptoms if the surgeon tries to dilate beyond even No. 7 or 8. Such cases often get on very well with that calibre of urethra, and require no further treatment. Each instrument should be taken out as soon as it is passed. After ten minutes' horizontal rest, the patient may go about his business again, provided no unpleasant symptoms ensue.

Continuous Dilatation.—The instrument is not withdrawn for forty-eight hours, and then only to have a larger size substituted for it. This is an especially good plan (*a*) when the instrument has been introduced with difficulty; (*b*) when false passage exist; (*c*) if ordinary dilatation is ineffective; (*d*) if each introduction of the instrument induces pain or rigors. Of course the bed must be kept during the treatment (*i. e.*, for a week or two). The catheter or bougie, when in, can be fixed by tapes or strapping (*vide* works on bandaging, etc.), or by tying it with thread to the hair of the pubes, a direction which some critics of Smith's and Walsham's operative surgery has termed unpractical. Practical or unpractical, I have myself constantly practiced it. A cradle keeps the bed clothes off the hips, etc. Liq. opii sed. ℞ xx, or morphia suppositories will relieve severe pain. Some patients cannot endure the treatment at all. Orchitis is a possible complication. Diarrhœa may require chalk mixture. Hæmorrhage may occur. Slight purulent discharge accompanies the treatment.

"*Vital*" *Dilatation.**—When the instrument will not pass through stricture, and there is yet no retention, pass a bougie down to stricture and leave it. Perhaps in a day or two it will pass.

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* Dupuytren, *Lecons Orales.*

Rupture by Holt's Dilators.—Mr. Holt passes an instrument consisting of two parallel blades, and then forcibly driving a tube down between them, ruptures the stricture. Give ether. Use sufficient force. Pass a No. 10 catheter immediately. Remove it at once, and pass it again at intervals of two days in first week, then once a fortnight; lastly, once a month. This plan has a great deal in its favor. *See* Mr. Holt's book.

Dilatation from Behind.—In certain cases, impermeable from the front, Mr. Furneaux Jordan has plunged a bistoury into the membranous part of the urethra, from the rectum, adjacent to which the membranous urethra lies. This is done by placing the patient in the lithotomy position, feeling for the anterior border of the prostate, and cutting exactly in the median line. Then a fine bougie is insinuated from behind forwards, through the wound.

Internal Urethrotomy.—Various forms of urethrotome. Some cut from behind forwards, others from before backwards, in almost all cases with a guide previously passed through stricture. Division from behind forwards preferred. Suitable cases are those strictures which either cannot be dilated beyond a small calibre, or which rapidly recontract after dilatation. *Operation* (with Civiale's urethrotome): Ascertain position of stricture by means of bulb at end of instrument. Pass the urethrotome so far down the urethra that when the blade is projected the incision shall commence about one-half inch beyond the stricture. Pull out the instrument, incising the urethra for about one and a-half inch altogether. There is no danger in a long incision, but real danger in incising very deeply. Proper depth about quarter of an inch. As a rule, pass no instruments for forty-eight hours. Then pass a sound at intervals, which should gradually increase, commencing at every other day. Always press its curve well down into site of incision. Internal urethrotomy is relatively best, and absolutely excellent in the penile portion of the urethra. Mortality, 10 in 1,192 (Teevan).

External Urethrotomy.—Suitable cases are those in which "large, numerous, or obstinate perineal fistulæ coexist with old or obstinate strictures. When other treatment has failed, and the fistulæ refuse to heal, even although the patient has withdrawn for some weeks his urine entirely by catheter, no proceeding perhaps offers so good a chance of cure as this. It is for such cases I reserve it now." * *Operation.*—Pass Syme's staff. Lithotomy position. Best light obtainable. Operator sits. Incise in line of raphe, 2 inches. Feel for staff with left forefinger. Take staff in left hand, and straight bistoury in right. With right-hand supine cut through stricture along groove of staff from behind forwards. Withdraw staff ¼ inch, and extend incision that distance further forwards. Shoulder of staff will now easily pass on through site of divided stricture, if the division has been thorough. Thompson passes a concave, curved director through the wound and towards the bladder, with the aid of which a catheter not smaller than No. 10, is afterwards guided into the bladder. If catheter is obstructed on its passage, stricture requires more complete division, which should be done there and then. Morphia suppository. India-rubber tubing to catheter. Withdraw catheter after forty-eight hours. Pass No. 12 bougie at intervals, first of four days, then one week, then a fortnight, and so on. If any difficulty in passing this be experienced before wound heals, pass a grooved staff, and, with a tenotomy knife in the wound, divide the obstruction.

Rules for Managing a Stricture impermeable to ordinary means.—It is assumed that there is no urgent retention. 1. Rest in bed without instrumental disturbance for three days or more. 2. Low diet, purgative, alkaline medicines, demulcent drinks. 3. Plenty of bed-clothing. 4. Opium, twenty drops of tincture; and 5, hot bath, 100°, rapid drying with towel—half an hour before surgeon's attempts to pass an instrument. 6. During catheterism, expose only the genital organs. Cover trunk and arms with blankets. 7. Give ether. 8. Commence with the very finest soft French bougie you possess. If you have not a filiform one, snip off the bulb of a "bougie à boule." 9. While an assistant is in the very act of injecting oil into the urethra, glide your bougie, by the side of the nozzle of the syringe, down to, and if possible through, the stricture. 10. If that fails, try a catgut; but if there are false passages, pass a No. 6 gum-elastic down to the stricture, and glide your filiform bougie down by its side. 11. As a rule, a perfectly new filiform bougie answers best, but occasionally the surgeon finds an individual one of particular merit, which he treasures up and uses again and again. 12. As the orifice of the stricture is not always in the axis of the urethra, the instrument should be conducted carefully first along one side of that passage, then on the other, then along the roof, then along the floor. The soft instrument can only be used in this way when the stricture is very near the meatus. Deeper strictures, when eccentric in position, require the silver catheter. (Thompson's probe-pointed catheter should be employed.) 13. When an instrument has been passed at last, but with great difficulty, it should be left in a considerable time, say forty-eight hours, careful note being made of the particular manœuvre which proved successful. Instead of withdrawing it to make room for a larger size, a Wakley tube can, with advantage, be passed over it. Wakley's tubes are of various sizes, and glide over the originally introduced catheter, which acts to them as a guide. 14. Whatever method is tried should have a fair trial. Fickleness is very likely to result in failure. 15. The attempts, if necessary, may be renewed on a future day. Suppose, however, one of those rare cases of genuine impermeability. The stricture may be near the meatus. Of course there will be false passages. In such a case I saw Mr. Furneaux Jordan pass a very sharp, fine-pointed bistoury into the glands where the meatus ought to have been (the meatus was itself occluded, and the last quarter or half-inch of the urethra too), and fortunately or skillfully hit the urethra beyond. No trace of a meatus had remained, the surface of the glans being merely cicatricial tissue. If the impermeable stricture be in the penile part of the urethra, but not near the meatus, divide it subcutaneously, that is, pass a grooved director down to the stricture. Feel the size and position of the stricture with the finger and thumb, from the outside. Then, observing your landmarks carefully, and having the penis well and steadily held up on your director, pass a sharp tenotome through the skin opposite the end of the director. Next, without enlarging the skin wound, and cutting always in the middle line, divide the stricture. When the tenotome has once reached the urethra on the proximal side of the stricture, the division can be accurately and thoroughly completed on a grooved staff. For genuine impermeable stricture in the bulbous part of the urethra, perineal section must be done, or the bladder may be punctured, after which catheterization may be possible, owing to the repose which the stricture thus gets from pressure *a tergo*. For treatment of retention, see Retention of Urine.

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* Thompson on Stricture, p. 241.

Perineal Section.—This operation resembles external urethrotomy, but differs from it in that the stricture, being impermeable, is not divided on a staff, but is carefully dissected through. The surgeon requires an excellent light. He should use all his knowledge of anatomy, constantly refer to the landmarks which are visible or palpable, and will do well to make the starting-point of his dissection the junction of the distal part of the urethra with the stricture, a point which can be fixed by the end of a *staff passed down to it*. Wórk throughout in the exact median plane of the body. The details of this operation have been admirably worked out by Wheelhouse, of Leeds. He uses a staff with a button-like end. Urethra is opened a quarter of an inch in front of stricture, the orifice of the latter being then searched for with the probe. See *Brit. Med. Jour.*, June 24, 1876.

Accidents of stricture are: Perineal abscess, perineal fistula, penile or ante-scrotal fistula, retention of urine, each of which is noticed in its alphabetical place.

False passage is a common effect of rough catheterism. *Treatment.*—If there is retention, the bladder may be reached sometimes by passing first one middle-sized instrument, then a fine catheter beside it. Otherwise, it is best to suspend attempts at passing instruments till the false passage has had time to heal. An instrument in a false passage moves freely, one in a stricture is gripped more or less tightly. Macleod, of Glasgow, recommends a course of quinine during the treatment of stricture. It is not unreasonable to think that it might act as a prophylactic against septicæmia.—C. B. KEETLEY.

URETHRITIS—*See Gonorrhœa.*

URETHROTOMY—*See Urethra, Stricture of.*

URINARY ABSCESS—*See Abscess, Urinary.*

URINARY FISTULÆ—*See Fistulæ, Urinary.*

URINE, Examination of the.—In order that the examination of the urine may be made on a definite plan, the following scheme, in which the most important clinical facts are directed to be ascertained, is recommended to the student. The order of examination that is here given should be followed, the details of each operation being described on the page stated at the end of each paragraph.

Scheme for the Examination of the Urine.—I. Observe the color of the urine, its appearance if clear, smoky, turbid, etc. II. Ascertain the specific gravity. III. Examine the reaction, whether acid, neutral, or alkaline, by means of litmus or turmeric paper. IV. Test the urine for albumen; if albuminous, look with the microscope for renal casts, pus corpuscles, red blood corpuscles. V. Test the urine for sugar. VI. If there be no albumen or sugar present, and no deposit, the urine need not be further examined, unless some special indication exist. VII. But if any sediment be observed, it must be examined with the microscope. The following enumeration of the more common deposits may help the student: Pink or reddish deposit, dissolved on heating test-tube—urate of soda; white crystalline deposit, soluble in acetic acid—phosphates; hummocky white sharply defined cloud, insoluble in acetic acid—oxalate of lime; white amorphous flocculent deposit, rendered ropy by alkalies—pus; brownish-red crystalline deposit—uric acid; red amorphous deposit—blood.

Physical Examination.—The physical examination of the urine is the application of the senses to its investigation without the employment of chemical analysis or the microscope. The color, translucency, odor and consistence are the only characters which can be ascertained by this simple method of observation. *Color.*—Urine is ordinarily of a reddish-yellow color; but it may be as colorless as water, or dark brown black like porter. A smoky tint is absolutely diagnostic of the presence of blood; a brownish green suggests the presence of the coloring matter of the bile. Many drugs, as rhubarb, saffron, and santonin, give a peculiar red color to the urine. The carbolic acid treatment of wounds colors the urine black. Tannin given by the mouth renders the urine colorless. A pale urine is seen in health, as the urina potus; and in disease, in anæmia, diabetes, nervous disorders (urina spastica), and convalescence from acute diseases. A pale urine contains little coloring matter, and but a small proportion of solid constituents, always excepting, however, the urine of diabetes mellitus. A pale urine is a sign that the patient is not suffering any high degree of pyrexia. A high-colored urine occurs in health after food, as in the urina cibi, and after much exercise; and in disease, in fevers, and most acute diseases, in which considerable metamorphosis of the tissues takes place. It contains much coloring matter and urea in proportion to the water. A dark urine should be examined for pigment. A dirty bluish-colored urine is sometimes seen in cholera and typhoid fever. *Translucency.*—In health, the urine deposits, after remaining at rest for a short time, a slight cloud of mucus, derived from the bladder and urinary passages; but, in all other respects, healthy urine is perfectly clear. On cooling, however, it may sometimes become turbid from the presence of urates, which are distinguished from other deposits by their appearing upon the cooling of urine which was perfectly clear when first passed. Should the urine be turbid when first voided, it is a mark of disease, and pus is the most common cause of this appearance. *Odor.*—It is not yet made out to what body the peculiar smell of the urine is due, nor is it of much importance to the clinical student. When the urine loses its natural smell and becomes fœtid and ammoniacal, the change is due to the decomposition of urea into carbonate of ammonia, and the formation of sulphur compounds; in cases of cystitis and paraplegia the alteration begins very quickly after being voided. Various drugs, as cubebs, and articles of diet, as asparagus, give a characteristic smell to the urine; turpentine gives the odor of violets to the secretion. *Consistence.*—The urine is a limpid fluid, flowing freely from one vessel to another. But in catarrh of the bladder and in retention of urine, the ammoniacal products of the decomposition of the urea render the pus present thick and viscid, thus causing the secretion to be ropy, and poured with trouble from one vessel to another. This is said to be due to the action of the alkali on the albumen, giving rise to the presence of alkali-albuminate. The froth on normal urine readily disappears, but if the froth be permanent, the presence of albumen, or of bile pigment, may be suspected. Before passing to the mechanical and chemical examination of the urine, it may be well to speak of the apparatus and reagents which will be found necessary by the student for bedside investigation. They are: Cylindrical urine glasses, each containing about 6 fluid ounces; a urometer, the stem of which is graduated from 1,000 to 1,060; blue and red litmus and turmeric paper; test tubes; a spirit lamp, or Bunsen's gas-burner; nitric acid; acetic acid; liquor potassæ, or liquor sodæ; solution of sulphate of copper, 10 grains to the fluid ounce, or Fehling's test solution for sugar; glass funnel and filtering paper. With this apparatus and these reagents, the student will be able to perform all the more important reactions described below.

Specific Gravity.—The specific gravity of the urine varies in health between 1015 and 1025; the simplest way of estimating it is by means of the urometer. In order to use this instrument, a quantity of the urine to be examined is poured into a cylindrical glass, and care is taken to remove all the froth which may form, either by blotting paper, or by overfilling the vessel. The urometer must then be slowly introduced, and allowed to float freely in the urine, without touching either the side or bottom of the vessel. Since the fluid accumulates around the stem of the urometer from the physical force of attraction, the specific gravity appears to be higher than it really is, when read off while the eye is above the surface of the fluid; to obtain a correct reading, therefore, the eye, must be lowered to the level of the surface of the fluid, and the number on the stem ascertained by looking at it through the urine: having noted this, the urometer should be depressed in the urine, and again allowed to come to rest, when the number may be *again read off;* the second estimation is made to correct any mistake that may have taken place in the first reading. The specific gravity thus ascertained should be noted down at once. The urine must be of the temperature of the surrounding air, otherwise great errors may creep in. The knowledge of the specific gravity of a few ounces of urine is a matter of little value. To render the observation in any way serviceable, the whole quantity passed in the 24 hours must be collected and mixed, and the specific gravity of this taken. A rough estimation of the solid matters passed may be made from the specific gravity in the following way; the two last figures are multiplied by 2 or 2.33 which gives the amount of solid matters in a 1000 parts of urine; if, for example, the specific gravity of the urine be 1020, 1000 grains of urine will contain 2 × 20, *i. e.* 40 grains of solids, or multiplying by 2.33—46.6. If but a small quantity of urine be given for examination, it is convenient to dilute it with two or three times its volume of distilled water, and then multiply the specific gravity by the number of volumes employed. If three volumes of water were used to dilute one volume of urine, and the specific gravity of this were found to be 1005, then four volumes multiplied by 5 would be 20: and 1020 would be the specific gravity of the urine. *Clinical Import.*—Sugar in the urine is the most common cause of a high specific gravity; if this body be not present, excess of urea will be the probable cause. A low specific gravity, below 1010, occurs after fluid has been taken in quantity. A low specific gravity is also noticed frequently in chronic Bright's disease, immediately after the paroxysm of hysteria, in anæmic states, and in diuresis from any cause, such as mental emotion, or exposure to cold. A high specific gravity with a pale color, and a low specific gravity with a deep tint, are equally signs of disease. A new urometer should be carefully tested, since those sold by the instrument makers give results varying as much as 10 or 12 degrees. The urometers in common use in hospitals are very rarely correct. As a rule, the smaller they are, the less accurate results are attained. Thus a large urometer and a large amount of urine should be used.

Reaction.—The urine is almost always secreted acid, although it may become alkaline within a very short time of being passed. In the majority of the cases in which the urine is said to be alkaline, as in paraplegia and cystitis, the alkalinity is really due to decomposition after being passed. If the urine, then, be found to be alkaline, a fresh specimen should be tested immediately after it has been voided. In cases of retention, the urine sometimes becomes alkaline in the bladder. In health, the urine can be made alkaline, by the administration of drugs, such as the carbonates acetates, citrates, or tartrates of the alkalies. When the alkalinity of the urine is due to ammonia, the brown color of the turmeric disappears when the paper is exposed for some time to the air, or gently heated; but the change from yellow to brown is permanent, if the alkalinity be owing to either potash or soda. The urine is rarely neutral to test paper; so that many observers have denied its occurrence. Occassionally the urine has ring equivocal reaction, reddening blue litmus, and restoring the blue color to reddened litmus paper. This amphigenous or amphoterous reaction, as it has been called, has not yet been satisfactorily explained; it is, however, without any clinical import. The most likely cause of the acid reaction of the urine is the presence of the acid phosphate of soda; and according to some observers, of free lactic and hippuric acids. Very shortly after being voided, the acidity increases, and lasts, in health, for days, free uric acid being often thrown down. Sooner or later, however, the alkaline fermentation sets in, and the urine becomes ammoniacal and fœtid from the conversion of urea into carbonate of ammonia, and the formation of sulphide of ammonium, while the phosphates and the urate of ammonia are deposited as a white sediment. *Clinical Import.*—The acidity of the urine is decreased during digestion, and increased by fasting or perspiration. A very acid, high-colored urine is associated with the "uric acid diathesis." This condition favors the occurrence of calculus and gravel. Alkalinity of the urine is nearly always due, if the administration of alkalies can be excluded, to the decomposition of urea into carbonate of ammonia. It is present in some diseases of the spinal chord, and especially in chronic affections of the bladder and urinary organs, as a few drops of urine, which have undergone the alkaline fermentation, will rapidly beget the same change in perfectly fresh urine. When the alkalinity of the urine is due to fixed alkali, either potash or soda, it is probably caused by the ingestion of alkaline salts, or, failing this, to a catarrh of the urinary passages, or some alteration in the metamorphosis of the tissues. About this last condition, little is known with certainty. It is always best treated by meat diet and iron.

Examination for Albumen.—This is the first and most important step in the chemical examination of the urine: the presence or absence of albumen must always be determined before proceeding to test for any other substance, and the search must never be omitted in the examination of any urine. The best way of testing for albumen is to fill a test tube about two-thirds full of the urine to be examined, and to heat the upper layer of the fluid over the flame of a lamp, the lower end of the tube being held between the thumb and forefinger of the observer. By employing this method, two strata of fluid are obtained for comparison. The heat is applied until the upper portion of the urine begin to boil, for although albumen, when in large quantity, coagulates at a point many degrees below boiling, yet the presence of a small quantity gives no precipitate below 212° F. The boiled stratum of fluid should now be carefully compared with the cool layer in the lower part, by holding the test tube against the light, or a black surface; if any cloudiness or opacity be seen, it must not at once be concluded that albumen is present; but a drop or two of dilute nitric acid should be allowed to flow gently down the side into the urine; the cloud is permanent, if due to albumen; but disappears immediately if due to the earthy phosphates. This addition of acid after boiling should never be omitted, since the most practised eye cannot distinguish, by appearance only, between the cloud of albumen and the phosphate of lime. *Cautions.*—1. The addition of the nitric acid not unfrequently carries down some of the coagulated albumen into the unboiled layer of urine, and thus causes the cloud to be less thick than before; such an appearance is never seen with phosphates; when they are the cause of the turbidity, the urine becomes absolutely clear, as before boiling; a slight brown color only following the addition of the nitric acid. 2. Should the urine be turbid from the presence of urates, it quickly becomes clear on the application of slight heat; and as it is desirable before testing for albumen to have a clear solution, the whole of the test tube should be passed two or three times through the flame of the lamp, until the urates be dissolved; the upper stratum of the urine should then be boiled, and compared with the lower, as above. 3. If the urine be neutral or alkaline at the time of testing, the albumen will not be precipitated by heat; the acid reaction must therefore be restored by a few drops of weak acetic acid, and the urine then boiled, and nitric acid added. If alkaline urine be boiled without previous acidulation, a deposit of phosphate of lime is almost sure to occur, which is immediately dissolved on the addition of an acid. If nitric acid be added, before boiling, to an albuminous urine, the albumen will often not be precipitated on the application of heat, because acid-albumen will be formed. Care must therefore be taken that it is acetic acid which is used in the preparatory acidification of the urine. 4. If the urine be permanently turbid, from any cause, and it is desired to know accurately whether albumen be present, the urine must be filtered before boiling; in this way very minute urine, albumen must likewise be present, derived from the corpuscles and plasma.

Examination for Sugar.—If the specific gravity rise above 1030, sugar may be suspected, and should be looked for. The sugar in the urine is grape sugar. Many methods of testing for sugar have been proposed; but only the most prominent and trustworthy will here be mentioned, although it must be confessed that a rapid, and yet trustworthy, test, suited to practitioners, is still a want. Before testing urine for sugar, it should be tested for albumen; and if this body be present, it should be removed by acidulating an ounce or two of the urine with one or two drops of acetic acid, boiling and filtering. In the same way, if the urine be high colored, it may be well to get rid of the coloring matters by throwing them down with a solution of acetate of lead and filtering. And if the urine be turbid from urates, it is very desirable to free the urine from these by filtration before applying the tests for sugar. *Moore's Test.* —Equal parts of urine, and liquor potassæ or liquor sodæ, are poured into a test tube, and the upper layer of this mixture is heated to boiling, in the manner described in the section on examination for albumen. The heated portion becomes brown red, dark brown, or black, according to the quantity of sugar present. The least change of color may be perceived by comparing the upper and the lower layers of the liquid. *Cautions.*—1. High-colored urines, and urines containing excess of phosphates, darken very perceptibly on boiling with caustic alkalies, and, if the urine be albuminous, the color will be greatly deepened, though no sugar be present. 2. It has been noticed that liquor potassæ which has been kept for a few weeks only in white glass bottles, takes up lead from the glass, and that a black precipitate of sulphide of lead is formed, when the alkali is boiled with certain urines which contain much sulphur. Care must be therefore taken that the liquor potassæ is free from lead. The value of Moore's test is chiefly negative; if the urine on boiling with liquor potassæ do not greatly darken, it may be assumed to be free from a hurtful quantity of sugar; if, however, much darkening occur, a further observation must be made with the copper or fermentation tests described below. *The Copper Test* depends on the property which grape sugar possesses, of reducing the higher oxide of copper to a suboxide. There are two methods of conducting this reaction, identical in principle, named respectively Trommer's Test and Fehling's Test. *Trommer's Test.*—About a drachm of the suspected urine is poured into a test tube, and liquor potassæ or liquor sodæ added in about the same quantity; a weak solution of sulphate of copper (about 10 grains to the fluid ounce) is dropped into the mixture. The precipitate which first forms is redissolved on shaking the test tube, and the copper solution should be carefully added, shaking the test tube after each drop has fallen into the mixture, so long as the precipitate is easily redissolved, when the solution will have acquired a beautiful blue or green color, but should be quite clear, and free from any precipitate; the contents of the test tube must next be heated to boiling, when, if sugar be present, an orange red precipitate is first thrown down, which, after some time, becomes reddish brown. This precipitate consists of the suboxide of copper. On boiling Trommer's test with urine, a change of color is seen in every urine; but this is no proof of the presence of sugar; the reaction is only known to be present when the reddish precipitate is thrown down. Since uric acid and mucus will also reduce copper when they are boiled with its salts, a similar solution should be set aside in the cold; and if at the end of the 24 hours the reddish precipitate have fallen, sugar is undoubtedly present. *Cautions.*—Much trouble is often at first felt in arranging the proper proportion between the copper solution and the liquor potassæ. Much of this, no doubt, arises quantities may be discovered. The method of testing for albumen, proposed by Heller, which consists in pouring nitric acid into a test tube, and allowing the urine to flow down upon the acid, so that the two fluids touch, but do not mix, and observing the white layer of coagulated albumen thus produced, is open to so many fallacies, that it cannot be recommended, save to experienced hands. Urea and urates are a common source of error, since they cause the appearance of a band very like that of albumen. A delicate test for albumen is the reaction with the ferrocyanide of potassium and acetic acid. The urine to be tested is made markedly acid with acetic acid, and then a few drops of a solution of ferrocyanide of potassium are added. If albumen be present, a white precipitate is thrown down. The tests with corrosive sublimate, tincture of galls, and carbolic acid, are unsatisfactory and untrustworthy. The old test of heat and nitric acid remains the one in which most confidence may be placed for recognizing the presence of the ordinary serum-albumen of the urine. The albumen of the serum of the blood is the albumen which is found most commonly and in greatest quantity in the urine. Other albuminous bodies, as paraglobulin and petpones, may also be found, as Dr. Lauder Brunton and Mr. D'Arcy Power have pointed out. Those which are not thrown down by heat and nitric acid may be recognized by the following tests: *The Xantho-protein Reaction.*—The fluid to be tested is boiled with nitric acid. If an albuminous body be present, the fluid becomes yellow, or a yellow precipitate is thrown down; and on cooling, ammonia changes the color of the fluid to an orange red. Another test is the violet color which appears on boiling the urine with liquor potassæ or liquor sodæ, and then adding a few drops of weak solution of sulphate of copper. A rough way of estimating the amount of albumen present in the urine, is to pour some of the urine into a test tube, until it be about half full, and to boil the whole of the urine in the tube, till the albumen be completely coagulated. One or two drops of nitric acid are then added, and the test tube is set aside for 24 hours; at the end of that time, the proportion of the coagulated albumen, which has collected at the bottom of the tube, to the rest of the fluid is noticed; if the albumen occupy one-third of the height of the fluid there is said to be one-third of albumen in the urine; or one-sixth, or one eighth, as may be. If, however, at the end of 24 hours scarcely any albumen have collected at the bottom, there is said to be a trace. If the urates have been deposited, the urine must be filtered before boiling, or a considerable error will creep in, by their increasing the apparent amount of albumen. *Clinical Import.*—The presence of albumen in urine is an important objective sign of disease. Any state, which brings about a mechanical impediment to the return of blood from the kidneys, will be accompanied by albumen in the urine; and the albumen will be persistent so long as the congestion of the kidney continues; the longer the albumen remains in the urine, the greater danger is there of permanent textural injury to the kidney. In many acute febrile diseases, albumen is often present, which, as a rule, disappears with the termination of the illness; but, if persistent, it affords evidence of organic disease of the kidney. In a chronic, non-febrile disorder, there being no hindrance to the return of blood from the kidneys to the heart, the discovery of albumen in a clear urine would point to structural change in the kidney. The search for renal casts must always follow the detection of albumen in the urine. The discovery of these structures renders it certain that the albumen, or, at least, part of it, is derived from the kidney. A common cause of the presence of albumen is pus, according to its quantity; in the urine of women, a small quantity of albumen is often due to leucorrhæal discharge, which is composed chiefly of pus. Gleet, and also, it is said, a great quantity of semen, cause albumen to be present in the urine. If blood be present in the urine, albumen must likewise be present, derived from the corpuscles and plasma.

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Too much copper should not be added. It is a good rule always to have a slight excess of potash, and never to operate save with a clear solution. *Fehling's Solution.*—(Dr. Pavy's solution is identical in principle with Fehling's solution.) In consequence of the difficulty of properly adjusting the quantity of alkali and copper in Trommer's test, many practitioners prefer to use a solution in which the copper and alkali are present in the exact proportion necessary. This solution may be prepared in the following way: 665½ grains of crystallized potassio-tartrate of soda are dissolved in 5 fluid ounces of a solution of caustic potash, sp. gr. 1.12. Into this alkaline solution is poured a fluid prepared by dissolving 133½ grains of sulphate of copper in 10 fluid drachms of water. The solution is exceedingly apt to decompose, and must always be kept in stoppered bottles, and in a cool place.* It is usually, therefore, more convenient not to mix the alkali and copper until the solution be wanted for use. In this case, a fluid drachm of the sulphate of copper solution may be added to half a fluid ounce of the alkaline solution prepared as above. About a couple of drachms of this test-solution are poured into an ordinary test-tube, and the fluid boiled over a lamp, and set aside for 12 hours. If no deposit form, the solution may be used for analysis; but if a red precipitate be thrown down, the liquid has decomposed, and a fresh supply must be had. While the solution is boiling in the test-tube, the urine must be added to it, drop by drop, and the effect watched. A few drops of urine which contain a large percentage of sugar will at once give a precipitate of yellow or red suboxide; but if no precipitate occur, the urine should be added to the fluid, drop by drop, any deposit being carefully looked for, until a quantity equal to that of the Fehling's solution employed, have been added. If no precipitate be found after setting the test-tube aside for an hour, the urine may be considered free from sugar. *Cautions.*—1. The test solution should never be used without boiling beforehand for a few seconds; the tartrate being exceedingly apt to decompose, and the solution then reduces copper as effectually as would grape sugar. 2. The quantity of urine used in the test should never be greater than the quantity of test-solution employed. 3. After adding urine in volume equal to the Fehling's solution, the boiling of the mixture must not be continued, as other bodies present in the urine, besides sugar, will reduce copper at a high temperature. *Fermentation Test.*—A few grains of German yeast are put into a test-tube, which must then be filled with urine, and inverted in a shallow dish already containing a little of the urine, or better still, quicksilver, and set aside in a warm place, as a mantel piece, or a hob. A glass bird fountain, if at hand, will be much more handy for this purpose than a test-tube. A similar test-tube or bird fountain must be filled with water, a few grains of yeast added, and both vessels subjected to the same conditions. If sugar be present, the formation of carbonic acid will, at the end of 24 hours, have driven nearly all the urine out of the test-tube or bird fountain; a few bubbles only will have appeared in that containing the water. To prove that this gas is carbonic acid, some caustic potash or soda must be introduced into the test-tube, when the gas will be quickly absorbed, and the urine again rise in the tube. *Estimation by loss of density after fermentation.*—Dr. Roberts of Manchester has found that, after fermentation, "the number of degrees of 'density lost' indicated as many grains of sugar per fluid ounce," and he proposes to estimate by this means the amount of sugar present. About 4 fluid ounces of the urine are placed in a 12-ounce bottle with a piece of German yeast of the size of a chestnut. The bottle is then set aside, very lightly covered, in a warm place, such as the mantelpiece, or hob, and by its side, a bottle filled with the same urine, but without any yeast, and tightly corked. In 24 hours the fermentation is almost finished; the fermented urine is poured into a urine glass, and the specific gravity taken with the urometer; the specific gravity of the unfermented urine is also taken, and the specific gravity of the fermented is subtracted from the specific gravity of the unfermented, the remainder giving the number of grains of sugar contained in a fluid ounce: for example, if the specific gravity of the unfermented be 1040, and that of the fermented 1010, the number of grains of sugar in a fluid ounce will be 30. According to Brucke, healthy urine contains sugar in about .01 per cent. Consequently a healthy man excretes daily through the kidneys about 15 grains of sugar. According to Leube, the excretion of sugar in diabetes is far greater during the night than during the day; urea follows just the opposite rule. *Clinical Import.*—If the foregoing tests announce the presence of sugar, in considerable quantity, as often as the urine is examined, diabetes mellitus may be inferred to exist. But should the presence of sugar in the urine be variable, and amount small, the fact is not of any known great diagnostic, or therapeutic, importance. Sugar is said to be present in the urine of the fœtus, of women when suckling, and of some old persons. It is seen in the urine during convalescence from some acute disorders, especially cholera, in malarious diseases, and in carbuncle. Certain injuries of the nervous system also bring on glycosuria.

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* Hawksley, of 300 Oxford Street, has succeeded in preparing a solution which keeps a long time.

Bile in the Urine.—The presence of bile in the urine can seldom be overlooked, since it gives a dark greenish brown color to the secretion. White filtering paper is colored yellow by the urine; a permanent froth is also formed by shaking the urine. The color given to the urine by drugs such as rhubarb and santonin is distinguished from that given by the bile pigments by the reaction of alkalies. Alkalies deepen the red of vegetable pigments, but turn bilious urine to a dirty brown. Two bodies must be tested for, the bile pigments, and the bile acids, each of which must be looked for by itself. The bile pigments. *Gmelin's Test.*—Ordinary nitric acid, which nearly always contains some nitrous acid, is poured into a test-tube to the depth of half an inch. A portion of the urine to be examined is then gently poured down the side of the tube, held almost horizontally, on to the surface of the acid, so that the two fluids may touch but not mix; this operation is most conveniently performed by means of a pipette. The test tube may then be nearly filled with urine. At the line of contact, a zone of red appears in every urine, but if pigment be present, the layer of urine above becomes green. This is the characteristic color; without it the presence of bile pigments cannot be predicated. This reaction may also be performed by allowing a drop of nitric acid, and of the urine to be examined, to run together on a porcelain dish, when a play of colors will be observed at the line of contact. But this is not so good as the first, as the green color is less perfectly seen. By waiting a few minutes, the green color will sometimes develop in a fluid which at first gave no reaction. *Caution.*—Any urine which contains a large amount of indican will give a blue or violet, and even green color, with nitric acid. The green color is, however, rarely seen with any other body than bile pigment. *Iodine Test.*—Some solution of iodine, not more than a drop or two, should be added to the urine in a test tube, and if bile pigment be present, the whole becomes of a fine green color. The green color is due to the formation of the same body, biliverdin, which causes the green reaction in Gmelin's test. The test is somewhat less delicate than that of Gmelin's. The bile acids. *Pettenkofer's Test.*—Some of the fluid containing the bile acids is placed in a porcelain fish, and a drop of saturated solution of cane sugar added; strong sulphuric acid is then dropped into the mixture, taking care that this acid is clearly in excess of the amount of bile acids present, that is, about the same volume as the fluid containing the bile acids. On applying heat (which must only be moderate) a beautiful cherry-red color is produced, passing into a deep purple. The purple color is the only reaction characteristic of the presence of bile acids. Another, and perhaps a better, way of applying Pettenkofer's test is to pour the fluid containing the bile acids into a test tube; sulphuric acid being then added, at first in small quantity to precipitate the bile acids, but afterwards in amount sufficient to redissolve them, which renders the mixture perceptibly hot to the hand. A drop of syrup may now be let fall into the liquid, which then shows a play of colors passing from pink to cherry red, and from red to purple. Strassburg recommends that the test should be applied to urine in this fashion; a little cane sugar is added to the urine and dissolved; a piece of filtering paper is dipped in the urine and then dried. When the paper is quite dry, a drop of concentrated sulphuric acid is let fall upon it by means of a glass rod, and after a quarter of a minute a beautiful violet color appears. I have used this test, but not with success. I feel unable to recommend it to the clinical student. Pettenkofer's test should never be applied directly to urine. The bile acids are never present in sufficient quantity to give the reaction, however modified, and the urine in jaundice frequently contains a small quantity of albumen which gives a reddish violet reaction with sugar and sulphuric acid, while the action of the acid upon the other constituents of the urine renders it impossible to be sure of the distinctive colors of Pettenkofer's test. If, therefore, it be very desirable to ascertain whether the bile acids be present in the urine, the method introduced by Hoppe must be employed for their separation; a long and somewhat complicated process, which can seldom be adopted by the clinical student. With this object, a pint or more of the urine must be rendered faintly ammoniacal with caustic ammonia, and then subacetate of lead added, so long as a precipitate falls. The precipitate must be collected on a filter, and washed with distilled water; then boiled with alcohol over a water bath, and filtered while hot; to the filtrate a few drops of potash or soda are to be added, and the solution evaporated to dryness over a water bath. The residue is again to be boiled with absolute alcohol over a water bath until but a little be left. This must be then thrown into a great excess of ether in a stoppered bottle, and after some time the alkaline salts of the bile acids will crystallize out. In order to prove that these crystals are salts of the bile acids, they must be dissolved in a little distilled water, and tested with Pettenkofer's method, as directed above. *Clinical Import.*—The bile pigments and the bile acids are present in the urine in most cases of jaundice. In hot weather, the bile pigments may sometimes be detected by means of Gmelin's test, in the urine of persons who are not jaundiced. Indeed, some believe that the bile pigments are always present in small amount in health, and the same may be said of the bile acids. The quantity of bile acids present in jaundice is scarcely ever .02 per cent. if the estimations on record may be trusted.

Hæmoglobin in the Urine.—Hæmoglobin may be known to be present in the urine by finding red corpuscles, or by the characteristic spectrum. The guaiacum test has of late been much used. A few drops of the tincture of guaiacum are added to the urine in a test tube, and then an excess of ozonic ether, that is, an ethereal solution of peroxyde of hydrogen. The mixture is shaken together, and on standing, the ether separates, of a fine sapphire blue color, if blood be present. The reaction depends upon the oxydation of the guaiacum by the ozonic ether; this, however, it is unable to do save in the presence of a body like hæmoglobin; so that it is the addition of the hæmoglobin which determines the reaction. The results of this test must always be received with caution, and can hardly be accepted unless confirmed by other evidence. Many other bodies besides hæmoglobin seem able to determine the oxydation of the guaiacum. Heller's test for hæmatin is somewhat out of date. It is practiced as follows: Liquor potassæ or liquor sodæ is added to the urine in a test tube, until a pronounced alkaline reaction be obtained; the mixture is then heated to the boiling point, and set aside. The precipitate of phosphates has a greenish to a reddish color when the urine contains hæmoglobin, methæglobin, or hæmatin. *Clinical Import.*—Dr. Mahomed has pointed out that the urine of patients who are about to suffer an attack of Bright's disease will sometimes give the guaiacum test for blood before albumen appear in the urine. He acknowledges, however, that confirmatory tests with the spectrum and the microscope may sometimes fail. In certain other diseases it is said that hæmoglobin may be detected by chemical tests, but yet no blood corpuscles seen with the microscope; such as poisoning by arseniuretted hydrogen, phosphorus, and sulphuric acid, jaundice, malignant cases of the acute specific diseases, and scurvy. Also in the disease called paroxysmal hæmaturia, it is said that no corpuscles can be found. But little is known about the coloring matters of the urine which have been named urohæmatin, uroxanthin, hæmaphæin, &c. Indican is a constant constituent of the urine, and by boiling with mineral acids, is decomposed into sugar, indigo red and indigo blue. With nitric acid, it imitates the reactions of the bile pigment. Heller pours a few drachms of fuming hydrochloric acid into a beaker glass and then adds about 30 or 40 drops of the urine. The fluid becomes red, violet, or blue, if much indicans have been present. Heller attributes the reaction to the presence of uroxanthin. Urobilin is one of the coloring matters of the urine, and is said to arise from the bile pigment. When bilirubin is given to an animal by the mouth, urobilin appears in the urine in quantity equal to the amount of bilirubin taken. *Clinical Import.*—Our knowledge of the urinary pigments in health is in so imperfect a state that nothing is known of the changes which they undergo in disease. Much indican is said to be present in the urine in melanotic cancers: and thus the presence of indican may be of help to the diagnosis when the cancer is situated in an internal organ, for example, the liver.

Urea.—Urea is the body characteristic of the urine; unless a fluid contain urea, it cannot be said to be urine. The source of the urea is still unknown; and it is much disputed if all or any part of it be made in the kidneys, the liver, the muscles, or the system at large. The clinical student may sometimes wish to know if the urine contain urea, or if a given fluid be really urine, or some other secretion. The fluid is first to be tested for albumen, which, if present, must be removed by acidulation with two or three drops of acetic acid, raising the temperature of the fluid to the boiling point, and filtering. This filtrate is used for the subsequent operations of evaporations, &c., as stated below. If the urine be free from albumen, some quantity, 2 or 3 fluid ounces, must be evaporated in a Berlin dish over a water bath, until the fluid have the consistence of syrup. A water bath is essential, because an open flame would decompose the urea. After the syrupy fluid has completely cooled, nitric acid, as free as possible from nitrous acid, is added drop by drop, so long as a precipitate is formed. An excess of nitric acid is desirable. Some of these crystals are of nitrate of urea, removed with a glass rod and placed under a microscope, show flat rhombic or hexagonal plates closely united to one another. Or a drop of the concentrated fluid may be let fall on a slide, and a drop of strong nitric acid may be added with a glass rod while under the microscope. Sometimes only a few drops of the fluid can be had, and the student should then let a little fall on a glass slide, set it aside in a warm place, such as a mantel piece, for the fluid to concentrate, then add some strong nitric acid, and place the crystals under the microscope. If the fluid contain urea, rhombic or hexagonal plates will be seen. *Clinical Import.*—Healthy urine may be looked upon as being chiefly a solution of urea and chloride of sodium; one-half of the solids being made up of urea, and one-quarter by chloride of sodium. Urea is the most important constituent of the urine; a healthy man secretes from 300 to 500 grains in the 24 hours. Its amount is increased in health by a high meat diet, and decreased by purely vegetable food. In some acute diseases, as pneumonia, typhoid fever, and acute rheumatism, it is said to be greatly increased owing to the excessive tissue-metamorphosis; it may be present in such quantity as to give a precipitate, wlthout previous concentration, when the urine is acidulated with nitric acid. Dr. Samuel West has, however, found in these diseases, that though the percentage of urea be high, owing to the small amount of urine passed, yet the total amount of urea is in many cases below the standard of health. In chronic diseases, especially those attended by a cachexia, or in uræmia and chronic Bright's disease, the amount of urea is below the average. In diabetes, the amount of urea secreted in 24 hours is increased; although the amount per cent. of urea is much decreased by the excessive flow of water which passes out through the kidneys.

Uric Acid.—Uric acid is a less oxydised stage of urea. If an urate be injected into the veins of an animal, an equivalent amount of urea appears in the urine. Uric acid is found in the urine of all carnivorons animals. In that of reptiles it entirely replaces the urea in the urine. To ascertain if the urine contain uric acid, it is necessary to acidulate about a fluid ounce of the urine with a fluid drachm of hydrochloric acid, or strong acetic acid, in a suitable glass vessel, an ordinary beaker being best, and to set aside, covered with a glass plate, for 24 or 48 hours. At the end of that time, if uric acid be present, reddish brown crystals will be seen attached to the sides and bottom of the glass, or floating on the surface of the fluid. These crystals have the flat rhombic, oval, or hexagonal shape of uric acid; they are soluble in alkalies, and give with nitric acid and ammonia the murexid test. A healthy man excretes, on an average, about 7 or 8 grains of uric acid in the 24 hours. *Clinical Import.*—The excretion of uric acid is usually increased pari passu with the urea in pyrexia, or acute rheumatism, and in chronic liver diseases, It is increased out of proportion to the urea in leucæmia. An excess of uric acid is observed after an attack of gout; it is often entirely absent fron the urine immediately before the paroxysm, and may disappear for days when this disease has become chronic.

Hippuric Acid.—The method of preparing hippuric acid from human urine is troublesome, and will rarely be required to be used by the clinical student. Two or more pints of perfectly fresh urine are evaporated to a syrup in a water bath, and then extracted with alcohol. The solution is filtered, the filtrate evaporated over a water bath until a small quantity be left; and to this, when quite cold, hydrochloric acid is added so long as crystals are found. The crystals of hippuric acid obtained in this manner, seen under a microscope, are long and needle-shaped prisms; they are distinguished from those of benzoic acid by their difficult solubility in ether. Hippuric acid, when evaporated to dryness with nitric acid in a porcelain crucible, over a lamp, and then further heated to redness, gives off a gas smelling like oil of bitter almonds. This reaction is common to benzoic and hippuric acids. *Clinical Import.*—Hippuric acid exists in small quantity in the urine in health; its amount is greatly increased by the eating of much fruit, and also by the ingestion of benzoic acid. The hippuric acid appears in the urine in quantity equivalent to the benzoic acid taken. Excluding these circumstances, hippuric acid is also found in quantity in the urine of fever patients, and may even be the cause of the acid reaction: the amount is also increased in diabetes and chorea. Nothing is known of the importance of this acid in therapeutics or diagnosis. In health the amount varies from 7 to 15 grains in the 24 hours.

Chlorides.—Chlorides may be known to be present by the following test. To a fluid drachm of urine in a test tube, a drop of nitric acid is added, and then a few drops of a solution of nitrate of silver; if a trace of chloride be present, a cloudiness only will be given; but if any quantity, a white precipitate is thrown down, soluble in caustic ammonia, and reprecipitated thence by the addition of nitric acid in excess. The nitric acid is added at first to prevent the precipitation of the phosphates with the chlorides. A rough comparative idea of the quantity of chloride present may be made from day to day, by always taking the same quantity of urine, acidulating it in a test tube with nitric acid, and adding a solution of nitrate of silver until no further precipitate is formed. The test tube must then be set aside for 24 hours, and a note then taken of the proportion of the chloride of silver deposit, for comparison with other observations. On an average, a healthy man secretes 250 grains of chloride of sodium in the 24 hours. *Clinical Import.*—During acute pneumonia, acute rheumatism, and most other pyrexial diseases, the chlorides diminish in quantity, or even disappear from the urine. Their reappearance in daily increasing quantity is a sign of the diminution of the intensity of the disease. The amount of chlorides apparently depends upon the digestive powers of the patient even in chronic diseases.

Phosphates.—The presence of phosphates in the urine may be ascertained by the following test. A fluid is prepared by adding a drop or two of caustic ammonia to a fluid drachm of a solution of sulphate of magnesia in a test tube; hydrochloric acid is added until the precipitate caused by the ammonia be redissolved. Caustic ammonia is again added in excess, until the fluid be strongly ammoniacal. A fluid drachm of urine is now poured into another test tube, and rendered ammoniacal with caustic ammonia; to this urine some of the prepared solution is added, and a precipitate of the ammoniaco-magnesiam phosphate occurs at once, if the urine contain the ordinary amount of phosphates; but the precipitate forms slowly, if the phosphates are present in very small amount. The quantity of phosphoric acid excreted by a healthy man in the 24 hours is about 50 grains. *Clinical Import.*—The amount of phosphoric acid in the urine is increased in diseases of the nervous centres, and of the bones, and after great mental application. Acute febrile diseases cause increase of the phosphoric acid from increased tissue-metamorphosis, while in Bright's disease and some forms of dyspepsia the quantity of the phosphates is diminished. Dr. Gee and Zuelzer have pointed out that the phosphates diminish or disappear after the acme of the paroxysm in ague, and after some other febrile disorders.

Sulphates.—The sulphates are at once recognized by the addition to some of the urine, in a test tube, of a drop of hydrochloric acid, and afterwards of a few drops of a solution of chloride of barium; a white precipitate, insoluble in nitric acid, is thrown down. The quantity of sulphuric acid excreted by a healthy man in the 24 hours is about 30 grains. *Clinical Import.*—The quantity of the sulphates is increased by full animal diet;

very little is known for certain of their amount in disease, and that little is at present of not much importance. The following table of the amount of urinary constituents excreted by a grown-up man in the 24 hours is compiled from Dr. Parkes' book on the Urine:

Quantity	40 to 50 fluid ounces.
Total Solids	800 to 1000 grains.
Urea	350 to 600 grains.
Uric Acid	5 to 15 grains.
Chlorine	50 to 150 grains.
Phosphoric Acid	30 to 60 grains.
Sulphuric Acid	20 to 60 grains.

In a healthy man, the hourly excretion of urine may vary from 20 to 200 C.C. In general, it is from 50 to 70 C.C. when much drink is taken, and 40 to 60 C.C. when little is taken. 1 kilogramme of body-weight, therefore, excretes about 1 C.C. of urine every hour. The urine is always diminished in quantity during the height of a pyrexial disease: a sign of improvement is the increase in the quantity of urine. When a disease is about to prove fatal, the quantity often sinks. In diabetes and interstitial nephritis, the quantity is increased; and this is often the case when collections of fluid in serous cavities are being absorbed.

Urinary Sediments.—When a urinary deposit is to be examined, about 4 or 5 fluid ounces of the urine should be collected in a tall narrow cylindrical glass, and set aside for a few hours. Cylindrical glasses have, in my own experience, succeeded better than conical vessels, since the sloping sides of the latter tend to cause the sediment to collect on them, without falling to the bottom. This is particularly the case with uric acid and renal casts, especially if they be present in but small quantity. Lately I have seen vessels in use with the bottom broader than the top, which seem likely to be useful for the purpose of collecting sediments. When the sediment has collected at the bottom, the supernatant urine may be poured off, and a drop of the fluid containing the sediment placed on a glass slide, for examination under the microscope. In looking for renal casts, it is better to use only the very last drops which fall from the vessel, after the rest of the urine is poured away. *Directions for the Microscope.*—A drop of the fluid containing the deposit is placed in the centre of the glass slide, which must be really clean, and the drop very gradually covered with a piece of thin glass (seven-eighths of an inch square is the best size), so as to drive all the air before it, and to prevent any air bubbles being present under the glass. This is best accomplished by the aid of a needle, placing one edge of the thin glass upon the slide, and resting the other upon the needle, then inclining the needle gradually, until it be horizontal. All superfluous moisture around the glass cover must be carefully removed with a cloth, or with blotting paper. The slide is then ready to be placed under the microscope. A quarter-inch object glass will be sufficient for the recognition of nearly all the sediments that the student will have to deal with. The tube of the microscope must be moved down until the object glass is about a quarter of an inch distant from the slide; the light from the mirror is now thrown upon the slide at a point immediately under the object glass; the observer should then look through the microscope, placing the instrument with the coarse adjuster in the focus which suits his own eyesight. Sediments are either organized or unorganized. To the latter belong uric acid, urates, oxalate of lime, phosphate, cystin, &c. To the former, pus, blood, mucus and epithelium, renal casts, fungi, and spermatozoa.

Uric Acid.—Uric acid is only met with as a deposit in very acid urine, and is usually accompanied by a considerable sediment of urates. Owing to its peculiar appearance, like cayenne pepper, it can at once be recognized by the naked eye, never being deposited from the urine in colorless crystals. When the sediment is examined under the microscope, the crystals are at once known to be uric acid by their reddish brown color, all other crystalline deposits being transparent and colorless. If, indeed, the student be in doubt as to the nature of a crystal, he will never be very wrong, if he judge it to be uric acid where there is a slight tinge of brown visible. The crystals, themselves, have numerous forms; they occur very commonly in rhomboidal, or long oval, plates with acute angles; these crystals are often united so as to form rosettes, or they may be rectangular, barrel shaped, or in hexagonal plates, with two parallel sides longer than the other four. If the student be not quite sure of their nature, he should add tc the specimen under the microscope, a little liquor potassæ or liquor sodæ, which will dissolve uric acid, if present; when dissolved by the alkali, it can be reprecipitated in hexagonal plates by the addition of hydrochloric or acetic acid. Traces may also be detected by means of the murexid test; a small portion of the suspected sediment is placed in a porcelain dish, and a drop of nitric acid let fall upon it; the dish is then gently heated over a lamp until all the nitric acid be driven off, when, if uric acid be present, a beautiful red staining is seen; after cooling, a drop of caustic ammonia should be allowed to roll over the reddened spot, which then becomes purple; if liquor potassæ be used instead of ammonia, the color will be violet. The test does not, however, distinguish uric acid from its salts. Usually the uric acid is not free when the urine is voided, but it is thrown down by the increase of acidity which always occurs shortly after emission. This is especially the case in the urine of diabetes, where the whole of the uric acid present may be set free from this cause. *Clinical Import.*—The presence of free uric acid is no proof that uric acid is being excreted in excess; the only inference that can be made, is that the urine is extremely acid. But if free uric acid show itself immediately after the urine has been passed, it is not improbable that a deposit may be taking place in the pelvis of the kidney, or the bladder; a state of considerable danger, since it may lay the foundation of a calculus; uric acid, and urate, calculi being the most common of all urinary concretions.

Urates.—This deposit is the most common and least important of all the urinary sediments. Any febrile state will lead to this deposit; even a greater amount of perspiration than usual, will be followed by urine that becomes turbid on cooling, merely as a result of a diminished secretion of water. 'Urine containing an excess of urates is never turbid when fresh passed; it is only when the urine has cooled, that the peculiar muddiness is observed. If the urine be gently warmed, the turbidity immediately disappears. The urates differ in color considerably, according to the amount of coloring matter in the urine, varying from white to pink or red. In young children the "milky" urine which alarms mothers, is due to a deposit of peculiarly white urates. In the urine, uric acid is found combined with three bases: with soda, with ammonia, and with lime. The urate of soda is the most common of the three, and is usually seen under the microscope as an amorphous deposit; sometimes it forms round dark bodies with short spikes projecting from them. The urate of ammonia is rarer and occurs in beautiful globular forms with spikes closely resembling the urate of soda, but of greater length. The urate of lime is very rare, and forms only an amorphous sediment. If any doubt be entertained as to the nature of these salts, it is necessary to add a drop of hydrochloric or strong acetic acid to the specimen when crystals of uric acid will immediately be formed. These crystals are again dissolved by caustic soda or potash. If further evidence be required, the murexid test with nitric acid and ammonia may be applied.

Oxalate of Lime.—Oxalate of lime is sometimes deposited from the urine during the acid fermentation, or even later. Oxalate of lime occurs as a urinary sediment in colorless octahedral crystals, having the so-called "envelope" appearance which, when once seen, can hardly be mistaken for anything else. This deposit also occurs in colorless dumb bells. Oxalate of lime is insoluble in acetic acid; by this it is distinguished from the phosphates : it is colorless and insoluble in alkalies, and thus differs from uric acid. It is, however, soluble in the mineral acids, as, for example, in hydrochloric acid. *Clinical Import.*—After urates, oxalate of lime is the most common unorganized urinary sediment; it is often seen in the urine of patients convalescent from acute diseases; and many writers state that it may always be found when there is lessened oxidation, as in bronchitis. The occasional presence of a few crystals of oxalate of lime is not of much importance. They are frequently seen in the urine after the eating of fresh fruit and vegetables. When the deposit is constant, and in large quantity, the formation of the mulberry calculus may be feared. This sediment is said to be associated with a dyspeptic and hypochondriacal condition, sometimes termed the "oxalic acid diathesis."

Phosphates.—The phosphates are only separated from alkaline, or very feebly acid, urine ; and they are also deposited when the urine undergoes the alkaline fermentation. They consist of the ammoniaco-magnesian phosphate, and the phosphate of lime. Both are usually found together. Under the microscope, the ammoniaco-magnesian phosphate appears in beautiful right rhombic prisms, which disappear immediately on the addition of acetic acid, and are thus distinguished from the oxalate of lime, with which an inexperienced observer might, perhaps, confound them. The phosphate of lime chiefly occurs as an amorphous deposit; it is insoluble in water, but soluble in acetic acid; in feebly acid urines it appears to be held in solution by the carbonic acid, so that it is precipitated by heat in flakes resembling albumen, which are at once however, dissolved by a drop of acid. *Clinical Import.*—The deposit of phosphates indicates an alkaline reaction of the urine, a condition favorable to the formation of phosphatic calculi. If the least doubt be left upon the observer's mind after the examination of a sediment with the microscope, he must use the aid of reagents in determining its nature. The following scheme will be found useful : a drop of strong acetic acid should be placed on the glass slide near the thin covering glass, so that the acid may run in between the two pieces of glass, but it should be carefully prevented from wetting the upper surface of the cover, as this will produce an obscurity over the object. Or after having placed a drop of the fluid containing the sediment upon the glass slide, the end of a thread should be placed in the drop, and then the covering glass laid upon it, so that the other end remains free ; the acid or other reagent may then be placed upon the free end of the thread, and is thus conducted along the thread to the sediment under the cover. Should the deposit be phosphatic, the acid quickly dissolves the crystals, or amorphous sediment; but if the sediment consists of urates, crystals possessing the well known shape of uric acid are formed. If no effect upon the sediment is produced by acetic acid, it consists of either uric acid or oxalate of lime. Liquor potassæ, added with the same precautions as acetic acid, but the alkali has no effect upon the oxalate of lime, which will be dissolved by the action of hydrochloric acid.

Cystin.—Cystin is a rare deposit in the urine ; it occurs in regular colorless hexagonal plates, united by their flat surfaces, and overlapping one another. When dissolved in the urine, cystin may be thrown down by the addition of acetic acid, and the precipitate examined under the microscope. It may be distinguished from uric acid, which sometimes crystalizes in hexagonal plates, by the absence of color in the crystals. Urine which contains cystin is usually feebly acid, of a yellowish green color, and of a peculiar odor, compared to sweet briar, but which sometimes resembles that of putrid cabbage. The urea and uric acid are diminished in most cases. The ammoniaco-magnesian often accompanies the crystals of cystin. Cystin contains a large quantity of sulphur, and Liebig proposed a test which is founded on this fact. A solution is made by adding liquor potassæ or liquor sodæ to a small quantity of solution of acetate of lead until the precipitate first formed be redissolved; about equal parts of this solution and of urine are boiled, when black sulphide of lead is formed from the combination of the sulphur with the lead. This test is, however, by no means a good one, since many bodies frequently present in the urine, for example, albumen, contain enough sulphur to give reaction. Of the Clinical Import, nothing is known. The appearance of cystin in the urine is believed by some to be hereditary and to be connected with calculous disorders. Other observers have found it in the urine of chlorosis.

Leucin and Tyrosin.—Leucin and Tyrosin are very rare deposits in the urine. Under the microscope, leucin appears in dark globular forms, which have been compared to masses of fat cells; tyrosin, however, crystalizes in beautiful bundles of delicate needles, sometimes arranged in a stellate form. It is said that these bodies have been detected in the urine in cases of acute yellow atrophy of the liver, of small-pox, of typhoid fever, and acute tuberculosis. If these bodies do not occur as a sediment, they may be looked for by the following method: a large quantity of the urine must have a solution of acetate of lead added to it so long as a precipitate forms. Through the filtrate, sulphuretted hydrogen is passed to remove the excess of lead; and the fluid is filtered again, evaporated over a water bath to a syrup, and then extracted with spirit. The leucin is dissolved in the spirit while the tyrosin for the greater part remains undissolved. The part insoluble in spirit may now be dissolved in water and boiled with a few drops of nitrate of mercury; if tyrosin be present, the fluid becomes rose red and soon after a red precipitate is thrown down. This test for tyrosin is called Hoffman's test and is said to be very delicate. The solution in spirit contains the impure leucin and requires further preparation. It must again be filtered, evaporated to dryness and dissolved in ammonia, and then acetate of lead added so long as a precipitate forms, then filtered and washed with a little water. The precipitate on the filter, which is a combination of leucin with lead, is suspended in water, and sulphuretted hydrogen passed through, the liquid again filtered, evaporated, and set aside to crystallize. The crystals that form must be tested in the following manner: They are carefully heated with nitric acid in a platinum crucible; if leucin be present, a colorless, almost invisible, residue is left, which warmed with a few drops of soda solution, becomes of a yellow color passing into brown. Another test is this: if leucin be heated in a dry test tube, oily drops are formed which give off the smell of amylamin. This preparation is undoubtledly very long and troublesome; but without it,, t is impossible to speak with confidence of the presence of leucin and tyrosin: of course, if a sediment suspected to be leucin or tyrosin be found in the urine it may be tested at once by the reactions given above. But the recognition of crystals under the microscrope, having the same form as leucin and tyrosin, is of no value, as in many cases, whether in health or disease, the urine will give crystals identical in form with leucin and tyrosin, but in which chemical tests altogether fail, or give the well-known reactions of other bodies.

Pus.—Pus is often present in the urine, and forms a thick sediment at *the bottom of the* urine glass. The urine readily becomes alkaline, and rapidly decomposes after being passed. It is permanently turbid; that is, the turbidity is unaffected by heat. Under the microscope, the deposit shows numerous pus corpuscles, round colorless bodies, not varying much in size, having granular contents, and nuclei varying from 1 to 4 in number; if acted on by acetic acid, the nuclei become much more distinct. If the urine have been long passed, the pus corpuscles undergo changes which render them incapable of being recognized. The urine of course contains albumen, and in proportion to the amount of pus present. If the quantity of albumen exceed that which should be given by the pus present in the urine, evidence of kidney disease, as casts of tubes, should at once be looked for. The deposit from urine containing pus is rendered viscid and gelatinous by the addition of about half its quantity of liquor potassæ; it becomes ropy and cannot be dropped from one vessel to the other; urine containing mucus on the other hand, becomes more fluid and limpid by the addition of caustic alkali. Pus occurs in the urine in the following diseases: Leucorrhœa in women. Gonorrhœa or gleet in men. Pyelitis, from any cause. Cystitis. Any abscess bursting into any part of the urinary tract. Leucorrhœa is an exceedingly frequent cause of the presence of a slight amount of albumen in the urine of women; if it be necessary to exclude this origin, the urine must be obtained by means of the catheter.

Blood.—Blood is not at all unfrequently found in the urine, and it may be derived from any part of the urinary renal tract. If derived from the kidneys, the blood will be completely diffused through the urine, and give it a peculiar smoky appearance, quite diagnostic. If the hæmorrhage from the kidney be great, however, the urine will have a bright red color, like blood. But when the urine contains a great deal of blood, the blood is usually derived, not from the kidneys, but from some other part of the urinary tract. The deposit at the bottom of the urine glass shows under the miscrocope the circular discs, familiar to every one as the red corpuscles of the blood. Their peculiar color will prevent the student mistaking them from any other deposit; they may, however, in a urine of low specific gravity, become swollen, pale, and at last burst from endosmosis; in those of high specific gravity, they will often become contracted, shrivelled and distorted, from exosmosis. The urine will, of course contain albumen in proportion to the quantity of blood present, which may be so great that the urine will solidify on the application of heat. The urine very readily becomes alkaline, and care must be taken to restore the acid reaction with acetic acid, before testing for albumen. *Clinical Import.*—The presence of blood, or of blood corpuscles, in the urine is a sign of hæmorrhage from the kidney or the urinary passages. It may result from: 1. *Disease of the Kidney:*—Acute Bright's disease. Congestion of kidney. Cancer of kidney. External injury. 2. *Disease of Pelvis and Uterer:*—Calculus in pelvis or uterer. Parasite, as Bilharzia hæmotobia. Cancer. 3. *Disease of the Bladder:*—Calculus. Cancerous or villous growth; congestion or ulceration of mucous membrane. 4. *Disease of Urethra:*—Congestion, as in gonorhœa. Tearing of the mucous membrane from mechanical injury. 5. In women, uterine discharges, as menstruation, &c.

If the amount of blood in the urine be small, the chances favor the belief that the blood is derived from the kidneys; search must therefore be made for renal casts. If the amount of blood be large, it probably comes from the pelvis of the kidney, ureter, or bladder; if from the pelvis or ureter, there will be pus, and probably also gravel in the urine, with pains in the loins, passing down into the thighs and testicles. If there be none of these indications, the blood probably comes from the bladder. It is commonly said, that if the blood be completely mixed with the urine, the hæmorrhage is from the kidneys; if the urine first passed be clear, and that at the end of micturition become bloody, or even pure blood be be passed, the hæmorrhage is from the bladder or prostate; while if the first portion of the urine be bloody, and the last drops clear, the hæmorrhage is from the urethra. These rules will, however, often be found to fail. The chief danger of hæmaturic is the formation of clots in the passages, and consequent ischuria. Small clots may sometimes form the nucles of a calculus.

Mucus and Epithelium.—Mucus is a constant constituent of every urine, and if healthy urine be allowed to remain at rest for an hour, a light cloud will be found to have settled at the bottom of the urine glass; on examination with the microscope, it will be found to consist of mucus corpuscles, and epithelium scales detached from the surfaces over which the urine has passed. The urethra and bladder give up a roundish or oval epithelium cell to the urine. In the urine of women, especially in cases of leucorrhœa, the epithelium cells of the vagina are very numerous; they exactly resemble the squamous epithelium of the mouth. Under irritation, the mucus membrane of the pelvis and ureter will produce cells, caudate, spindle-shaped, and irregular, very like those formerly looked upon as diagnostic of cancer. From this circumstance it is impossible to speak positively of the existence of cancer cells in the urine. Desquamation of the tubular epithelium of the kidney occurs only in disease; the cells as seen in the urine, are slightly swollen, and acquire a more spheroidal, and less distinctly polygonal, shape, apparently from the imbibition of fluid, and the removal of pressure. The cells are frequently granular, and contain fat drops, or are contracted, withered up, and shrivelled.

Renal Casts.—In Bright's disease, and in congestion of the kidney, there are formed, in the uriniferous tubules, lengthened cylinders which are discharged with the urine, and form the deposit known as "casts." Those found in the urine are probably chiefly formed in the straight uriniferous tubes; and the view of their origin, which found most favor in this country, was that the casts were formed by the escape of blood or plasma into the tubes of the kidney, and coagulation of the fibrin, which thus became moulded to the shape of the tube into which it had been extravasated. It is possible that many of the hyaline casts are formed in this way; but the balance of evidence at the present day is in favor of the epithelial and granular casts being produced by a desquamation and degeneration of the renal epithelium. When the urine contains casts in great quantity, they can scarcely be overlooked, if the urine be allowed to settle for a few hours in a tall cylindrical glass, the whole of the supernatant fluid poured off, and the last drops which flow from the lip of the glass put under the microscope and examined. If there be but few casts present, the whole of the urine of the 24 hours should be collected in a tall glass and allowed to settle for about 12 hours. The urine must then be all poured away, save the four or five ounces which have collected at the bottom. This residue must then be allowed to settle again for a few hours, when if casts be present, they will be found at the bottom of the glass, the last drops poured away being put under the microscope. Casts may oftentimes be missed if the urine given for examination be only the upper layer of a specimen which has settled for some time and of which all the casts have fallen to the bottom. It thus sometimes becomes of importance to collect all the urine passed. With a little experience, the student will soon become familiar with the appearance of casts, and will at once be able to distinguish them from foreign bodies in the urine. They are never broader than 6, or less than 2, red blood corpuscles in diameter; but they vary considerably in length, never, however, exceeding the $\frac{1}{60}$th of an inch. The *same cast does not vary* greatly in its diameter, and never becomes twisted on itself, as a cotton fibre does. The foreign bodies, most likely to be mistaken for renal casts, are cotton fibres, hair, and pieces of deal. Cotton fibres have a very irregular outline, and are much broader at one point than another; they are often twisted, and of great length, which will distinguish them from casts. Their structure is often striped in a longitudinal direction. Hair can often be distinguished from renal casts by its color alone; and if this be not very apparent, by its possessing a cortical and medullary structure; and by its length being greater than that of any cast.

Fibres of deal, which have their source in furniture, flooring, &c., may perhaps be mistaken for renal casts. They are at once recognized by the presence of the large round wood-cells which characterize the tribe of coniferæ. Casts may be conveniently divided, according to their appearance under the microscope, into three kinds, the epithelial cast, the granular cast, and the hyaline cast. *The epithelial cast.*—The cylinder consists of a mass of epithelium cells derived from the tubules of the kidney ; the cells may become granular and acquire a dark appearance by transmitted light. The cast is usually wide, never very narrow. *The granular cast.*—This is a solid cylinder having a granular appearance, which may be limited to a few dark points in the substance of the casts, or be so intense as to give the casts an almost black appearance. In this kind of casts may often be found epithelial cells, blood corpuscles, red or white, pus corpuscles, crystals of uric acid, urates, and especially oxalate of lime. *The fatty cast* is a variety of the granular, produced by the running together, into globules, of the granules of fat. *The hyaline cast.*—This cast is usually very transparent, and the outline is often so indistinct that a little iodine or magenta must be added to the urine before it can be detected, or a diaphragm with a narrow opening must be used. They show indistinct markings on their surface, or a few granules and nuclei. There are two kinds, the wide and the narrow; the latter are sometimes of great length. In observing casts, notice must be taken of the action of acids upon them, or their contents. It is thought that when the cylinders resist the solvent action of hydrochloric acid to any great degree, that the inflammation of the kidney is correspondingly intense. The granules on the cast, if albuminous, will disappear, when acted on by acetic acid; but, if oily, they are rendered more distinct. The width of the cylinder is of some importance, as it is supposed that very broad casts are formed in tubules completely stripped of their epithelium, and that the prognosis is more grave when these wide casts show on their sides no nuclei, or attempt at re-formation of epithelium. From the recent observations on the varying diameters of the uriniferous tubes, the importance of the breadth of the cast becomes less. *Clinical Import.*—The presence of casts in the urine is a sure sign of disease of the kidney, but not, however, necessarily of permanent disease of the kidney. They are present in many acute diseases, accompanied by albumen in the urine; but if they are found for several weeks together, after all fever have left the patient, then permanent disease of the kidney may be inferred. Casts are constantly present in the urine in all cases of congestion of the kidney, and of acute or chronic Bright's disease. But no certain information as to the nature of the disease existing in the kidney, for example, whether lardaceous or otherwise, can be had from the characters of the casts, since all forms of Bright's disease end in fatty changes. Some help may, however, be derived from the appearance of the casts in forming a judgment of the acute or chronic character, or a prognosis, of the disease. If, for example, there be found in the urine epithelial casts which have undergone little, or no, granular change, and casts studded with red blood-corpuscles, together with a large quantity of epithelium from the tubules of the kidney, having a natural or only slightly clouded appearance, there can be little doubt that the patient is suffering from an acute attack of Bright's disease; while if the casts be chiefly fatty, or intensely granular, and the epithelium be small in amount, and the cells withered and contracted, or containing globules of oil, it will be more than probable that the case is one of chronic Bright's disease. Since little trust can be put in the characters of the casts as an aid to special diagnosis, some of the leading characters of the renal derivatives in the chief forms of kidney affection will now be spoken of more at length.

Congestion of the Kidney.—The casts are chiefly hyaline, seldom showing any marks of fatty change. Very rarely may blood or epithelial casts be discovered. *Acute Bright's Disease.*—At the beginning, the urine deposits a sediment which consists of blood-corpuscles, narrow hyaline casts, and casts covered with blood-corpuscles, the "blood cast" of some authors. In the next stage, the amount of blood present is not so great, but a great desquamation of the renal tubules taking place, renal epithelium and epithelial casts are found in great numbers; the epithelium has undergone little, if any, granular change; hyaline casts are observed together with epithelial. In the next stage, the changes in the epithelium may be almost daily observed; at first they become granular, cloudy in appearance, which change often goes on to fatty degeneration, and the epithelial cells then contain large fat drops, while the epithelial casts undergo a like change, and become distinctly granular and even fatty. If the patient recover, the casts and epithelium slowly disappear from the urine, but if the case become chronic, the renal derivatives show the characters described in the next paragraph. *Chronic Bright's Disease.*—Numerous forms of casts are met with; the hyaline, both narrow and wide forms; the larger are often beset with granules dissolved on the addition of acetic acid; the granular, whose surface is often covered with fatty or shrivelled-up epithelium cells; fat drops may stud the cylinder. Epithelial casts are rare, except in febrile exacerbations, when the renal derivatives found in acute Bright's disease are present, together with granular and fatty casts, evidence of the previous alteration of the kidney. *Lardaceous or Amyloid Kidney.*—The Urinary deposit contains hyaline casts, which sometimes gives the amyloid reaction, and which are often accompanied by pus corpuscles. Atrophied epithelial cells, becoming fatty in the latter stages of the disease, are almost invariably present.

Fungi.—Many kind of fungi grow in the urine after it has been voided for some time, and when the ammoniacal decomposition has begun, or is about to begin. The most important are (*a*) bacteria, also known as vibriones, monas crepusculum, microzyma, and the like. Their origin has been warmly contested, but it cannot yet be said that any source save that of *omne ovum ex ovo* is proved. They will be often known by their incessant motion; but care must be taken not to confound with bacteria inorganic particles showing the molecular movement. They show various forms, chiefly linear, and need a high power of the microscope to recognize them; (*b*) the penicilium glaucum, the fungus which forms "mildew," and which often appears when the acid fermentation has begun; (*c*) the yeast fungus, torula cerevisiæ, or, saccharomyces urinæ, oval cells about the size of a blood-corpuscle, joined together in a row, considered by Dr. Hassall to be diagnostic of diabetes; (*d*) sarcinæ are apparently formed in the urine before it be voided; they are square bodies, divided into secondary squares, which number 4, 16, 64, &c., and are like the sarcinæ found in the vomited matters of persons suffering from stenosis of the pylorus. Kiestein is a whitish pellicle formed on the surface of the urine of pregnant women, when allowed to remain at rest for a few days. It appears to consist chiefly of the mould fungus, globules of fat, and crystals of phosphates. Formerly it was thought to be a sign of pregnancy; but it is seen in the urine of men, and it is not always present in pregnancy.

Spermatozoa.—These little bodies are present in the urine of men first passed after an emission of semen. A few pass away in the urine, probably, without venereal excitement, especially when the person is continent. In the urine of women, they are almost positive proof of sexual intercourse. The seminal secretion forms a glairy white deposit at the bottom of the urine glass. When examined with the microscope (for which a high power, magnifying 400 or 500 diameters, is best, although a power of 250 will identify them), spermatozoa show the characteristic oval head or body often somewhat pear-shaped, and long delicate tail, two or three times the length of the head. In the urine no movement is ever shown by these bodies.—J. WICKHAM LEGG.

URINE, Abnormal Conditions.—I. ALBUMINURIA.—*Etiology.*—The chief causes of albuminuria are: 1. Admixture of certain materials which contain albumen, namely, blood or some of its elements, chyle or lymph, pus from any source, or semen. 2. Renal congestion, particularly mechanical hyperæmia due to obstructive cardiac diseases, to chronic lung affections, or to pressure upon the renal veins or the inferior vena cava by a tumor, a pregnant uterus, or a collection of fluid. 3. Acute febrile and inflammatory diseases, *e. g.*, the exanthemata, cholera, diphtheria, pyæmia, ague, pneumonia, serous inflammations, rheumatic fever, and the pyrexial condition which arises in the course of chronic diseases, such as phthisis. 4. Certain affections attended with an unhealthy state of the blood, and relaxation of the tissues, such as purpura and scurvy, these conditions being also supposed partly to account for the occurrence of albuminuria in pregnancy. 5. Acute and chronic Bright's disease, the albuminuria being then mainly due to organic changes in the kidneys. 6. Chronic lead poisoning, and likewise poisoning by inhalation of arseniuretted hydrogen or carbonic anhydride. 7. The use of a highly albuminous diet, especially of abundance of eggs, as well as some forms of dyspepsia. 8. Cold bathing in some cases. Albuminuria from the causes last mentioned is, however, only slight and temporary. Dr. Bence-Jones has described a peculiar form of albuminuria in connection with osteo-malacia. *Symptoms and Diagnosis.*—The local symptoms, as well as the characters of the urine in cases of albuminuria, will depend upon its cause, and they present considerable diversity. The presence of albumen is determined by the tests already described, its amount being very variable. The kind of albumen also differs, it being usually that derived from the serum of the blood, but when the condition is due to errors in diet or deranged digestion it is of the nature of egg albumen. Other special varieties are found in exceptional instances, such as that described by Dr. Bence-Jones. The drain of albumen from the blood may itself cause serious disorder of the general system, such as anæmia and its consequences, wasting, debility, and ultimate fatty degeneration of structures. The *diagnosis* of the cause of albuminuria must be determined by the general history of the case, the characters of the urine, the accompanying general and local symptoms, and the condition of the several organs. It is important to recognize the fact that considerable variations in the degree of albuminuria may be observed in the same case at different times and under different conditions, it being sometimes intermittent, and that this symptom may be entirely absent in grave forms of renal disease. *Treatment.*—Albuminuria does not usually call for any direct treatment, and the chief measures to be adopted are those which have for their object the prevention or removal of the cause of the morbid condition, if this is practicable, such as regulation of diet, improvement of the renal circulation, or the cure of any organic disease. Medicines are sometimes employed with the view of checking the escape of albumen, of which the principal are tincture of iron, tannic or gallic acid, mineral acids, alum, and iodide of potassium.

It is very questionable, however, whether either of these drugs is really useful for this purpose. The effect upon the system of the loss of albumen may be made up for in some cases by nutritious food and the administration of iron.

II. PYURIA.—*Etiology.*—The sources of pus in the urine are: 1. Abscess in the kidney; 2. Pyelitis; 3. Cystitis; 4. Urethral inflammation, especially gonorrhœa; 5. Leucorrhœa in females; 6. The rupture of any neighboring abscess into the urinary passages. *Symptoms and Diagnosis.*—Pyuria is determined by the general characters of the urine; by chemical examination, which reveals the presence of albumen, and the peculiar peculiar ropiness with alkalies; and by microscopic investigation, when the pus-corpuscles, or, rarely, pus casts may be visible. The amount of pus discharged varies considerably. The urine may be highly offensive. With regard to *diagnosis,* one of the chief difficulties is to determine whether pyuria results from pyelitis, or from chronic inflammation of the bladder and lower urinary passages, especially when these conditions are associated together. The presence of epithelium cells from the pelvis and infundibula of the kidneys is very important at an early period in revealing pyelitis, but these elements disappear in course of time; if the complaint exists alone, however, the local symptoms, and the discharge of acid urine containing much pus, especially if combined with a history of some obvious cause of pyelitis, are sufficiently distinctive. When pus comes from the bladder, it is frequently ropy and tenacious, on account of the urine being ammoniacal, while it is also discharged mainly towards the end of the act of micturition. When disease of the lower passages and bladder has been in existence for a length of time it is highly probable that the kidneys are likewise involved. When pus originates in urethral inflammation, there are the local signs of this condition while pus escapes before the urine, and can be pressed out independently. In doubtful cases where there is leucorrhœa, it has been recommended to pass a catheter, and thus to remove some of the urine directly from the bladder for examination. *Treatment.*—Should pyuria require special treatment, the principles are: 1. To remove any obvious cause of the suppuration if possible; 2. To administer remedies to check the formation of pus, the chief being alum; astringent preparations of iron; mineral acids; tannic or gallic acid; vegetable astringents, particularly decoction of uva ursi or buchu; metallic astringents in obstinate cases; balsams and resins, especially balsam copaibæ; and turpentine. If the bladder is affected, injections of warm water are useful; or even astringent injections might be carefully employed; 3. To support the general health, and to treat the constitutional state by good diet, change of air, sea bathing, tonics, and cod liver oil.

III. CHYLOUS URINE—CHYLURIA.—*Symptoms.*—This is a peculiar condition, in which the urine generally presents a whitish, opaque and milky aspect, but occasionally is somewhat bloody. It contains albumen, fibrin, and fat in variable proportions. When the urine is allowed to stand, a soft coagulum forms, while the fat collects on the surface as a creamy layer. The microscope reveals in addition to fat molecules, granulated nucleated corpuscles resembling chyle-corpuscles. Frequently considerable emaciation and debility accompany chyluria, but these symptoms are by no means constant. The condition may only be present at intervals, of variable duration; or it may be completely cured. Drs. Lewis and Cunningham have discovered a minute nematoid worm to which they have attributed chyluria, named the Filaria sanguinis hominis; numbers of these are found in the urine, and they have also been seen in the blood. The condition is chiefly met with in tropical climates, in some countries being endemic. The adventitious elements in the urine are generally supposed to be derived from the blood in the kidneys, but Dr. William Roberts believes that they come directly from the absorbent vessels. He remarks: "It may be supposed that aggregations of these little animals (Filariæ) in the kidneys or some part of the urinary tract, give rise to rupture of the lymphatics and a leakage of their contents into the urinary channels, and in this way produce chyluria." It is not by any means certain, however, that chyluria is connected with Filariæ, and some observers have attributed the condition to mere dilatation and consequent rupture of the lymphatics. *Treatment.*—Medicines seem to have but little effect on chyluria, but the complaint is sometimes cured spontaneously. The chief drugs which have been employed or recommended in its treatment are tincture of iron; astringents, especially large doses of gallic acid; and large doses of iodide of potassium. Dr. William Roberts quotes a case which was benefited by decoction of mangrove bark. Salt water baths may be used, aud it seems best to restrict animal diet.

IV. HÆMATURIA.—*Etiology.*—The blood in hæmaturia may come from the kidneys; from their pelvis or infundibula, or the ureters; from the bladder; from the urethra; or, in females, it may be connected with uterine or vaginal hæmorrhage, including ordinary menstruation. Excluding the latter, the causes of hæmaturia may be arranged thus: 1. Traumatic, *e. g.*, external injury affecting any part of the urinary apparatus, severe exertion and straining, injury by instruments, and laceration of the mucous membrane of the pelvis of the kidney, ureter, bladder, or urethra by a calculus. 2. Renal affectionns, viz., congestion, including the active hyperæmia induced by certain articles, especially turpentine and cantharides; acute Bright's disease, suppurative nephritis, cancer, tubercle, renal embolism, minute calculi in the tubules, hydatids and other parasites. 3. Affections of either pelvis or ureter, viz., cancer, tubercle, and parasitic diseases. 4. Affections of the bladder, including congestion; acute cystitis; cancer, especially if of a villous and fungous nature; and varicose veins. 5. Gonorrhœa and other urethral inflammations. 6. Endemic. This calls for special notice, being a form of hæmaturia observed in certain hot climates, especially the Mauritius, which has now been proved to be due to a small parasite—Bilharzia hæmatobia—affecting the mucous membrane of the pelvis of the kidney and of the bladder. 7. Abnormal conditions of the blood particularly in connection with purpura and scurvy; but also in malignant fevers, cholera, and other affections. 8. Vicarious, chiefly of the menstrual discharge. 9. Mental emotion in rare instances, it is said. *Symptoms and Diagnosis.*—For purposes of diagnosis it is highly important to notice whether blood present in urine is passed constantly, or only at intervals, or under particular circumstances, as after riding, jolting, or taking certain articles of food; the mode of its discharge, whether before or after the urine, or along with it, and also if it escapes independently of micturition; its amount; and the degree in which the urine and blood are mingled, whether they are intimately mixed, or more or less separate, or if the blood forms distinct coagula. The characters of hæmaturix associated with most of the local lesions mentioned above will be hereafter pointed out. At present all that need be said is, that in renal hæmaturia the blood and urine are intimately mixed, the color being frequently smoky, while under the microscope minute moulded coagula or casts are usually visible, being in some cases numerous and decolorized, and accompanied with other renal structures; in bleeding from the pelvis or ureter there is also an inti
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become quite clear, blood again appearing at the close of the act. It may, however, flow back into the bladder from the urethra, thus coloring the urine contained in this organ. Blood is sometimes purposely mixed with urine by hysterical patients and malingerers. The diagnosis of hæmaturia may be further aided by a consideration of the history of the case, and of the previous symptoms, which might reveal some cause such as a calculus; the seat of local urinary symptoms, whether pointing to the kidney, bladder or urethra; the results of thorough physical examination; and the general symptoms present. *Treatment.*—This must be conducted on exactly the same principles as are followed in the treatment of other hæmorrhages. The most valuable internal astringents in hæmaturia are gallic or tannic acid, acetate of lead, or full doses of dilute sulphuric acid, combined with a little opium. The subcutaneous injection of ergotin deserves trial. The local use of cold is also often highly beneficial, in the form of ice applied to the loins, hypogastrium, or perinæum, or of cold injections into the bladder; astringent injections are also permissible in some forms of vesical hæmorrhage. Dry cupping over the renal regions is frequently very useful when the blood comes from the kidneys; and occasionally local removal of blood is desirable. Pressure can be applied in the case of urethral hæmorrhage, and for this purpose it may be requisite to pass a catheter or sound. After the occurrence of renal hæmaturia, it is important to watch the case for some time, as coagula may remain in the tubules and thus set up serious mischief.

V. HÆMATINURIA.—*Etiology and Pathology.*—The urine occasionally contains more or less of the coloring matter and albumen of the blood, but no corpuscles or fibrin, and to this condition the term hæmatinuria has been applied. This has been observed in connection with septic and malignant fevers, occasionally in purpura and scurvy, after poisoning by arseniuretted hydrogen or carbonic anhydride; and as a distinct affection named paroxysmal or intermittent hæmatinuria, which seems to be chiefly caused originally by cold, but has also been attributed to injury over the renal region, and exposure to malaria. Pathologically the condition has been supposed to be due to the red corpuscles of the blood becoming disintegrated and dissolved, or to a nervous disturbance leading to a temporary dilatation of the renal vessels, with the consequent escape of some of their contents without rupture. It is highly probable that in some of the cases described corpuscles have been present in the urine originally, which have subsequently broken down and become dissolved. *Symptoms.*—Intermittent hæmatinuria comes on in sudden and usually irregular paroxysms, varying much in their frequency in different cases, only occurring during the day, and generally lasting from three to twelve hours; being preceded for a brief period by chills or rigors, languor, a sense of weight or dull pain over the kidneys, pain or stiffness in the legs, occasionally retraction of the testicles, and nausea or vomiting. As a rule there is no pyrexia, and the temperature falls in some cases below the normal. The urine becomes very dark, resembling porter or port wine; usually turbid, and highly albuminous; while it deposits a chocolate-colored sediment which microscopically is seen to consist chiefly of granular matter, sometimes mixed with hæmatin crystals, and often with a few dark granular casts and crystals of oxalate of lime. Spectroscopic examination shows two absorption bands between the orange and green portions of the spectrum, characteristic of the presence of oxyhæmoglobin, and Drs. Forrest and Finlayson, of Glasgow, have reported cases in which they noticed in addition "a third, somewhat narrow, absorption band about the middle of the red in the spectrum," which they regard as due to the presence of metahæmoglobin, though they are not certain as to the nature of this substance. In the intervals the urine seems to be quite normal, and the change to the healthy condition may be equally sudden with the onset of the paroxysm. *Treatment.*—Full doses of quinine and iron have been found of most service in the treatment of this complaint.—Frederick T. Roberts.

URINE, Extravasation of.—When extravasation of urine is described as a distinct disease, it usually means that which is caused by the urethra bursting just behind a stricture. Rupture of the urethra from violence causes similar symptoms. Extravasation into the pelvis, or into the peritoneal cavity, may result from rupture of the bladder, *quod vide.* *Symptoms.*—Patient has a stricture of the urethra with retention. Sudden sensation of relief, and, simultaneously, of something giving way in perineum, succeeded by stinging, burning pain in the part. Then swelling successively of perineum, scrotum, penis and hypogastrium. Pain; fever, which soon assumes a low or "typhoid" character. Skin of parts affected dusky red or purple. Rapid sloughing wherever the extravasated urine finds its way. Œdema, emphysema. The retention itself is sometimes relieved by this accident. *Prognosis.*—In some cases the urine again begins to flow by the urethra, further extravasation ceases, abscesses form and the sloughs are cast off—the patient recovering. But it is generally considered that in most cases operative interference is urgently demanded. Then there is still great danger, first, from the acute gangrene, &c., and lastly, from the prolonged suppuration which ensues. The whole of both testicles may be denuded by the sloughing; but, if patient survive, the skin will heal and contract over them. *Anatomy.*—It is almost always the bulbous part of the urethra which gives way. Then the attachment of the deep layer of the superficial fascia to the posterior border of the triangular ligament, to the rami and body of the pubes, and to Poupart's ligaments prevents any passage of the urine into the thighs, ischio-rectal fossæ, pelvis or buttocks. *Treatment.*—Indications: 1, to relieve the original retention; 2, to give vent to the sloughs and extravasation; 3, to support the strength. To relieve the retention a catheter should be passed, if possible, and left in. The retention is sometimes relieved by the free incision which should be made in the perineum, to give vent to the urine and sloughs. This free incision should always be made. In making it, place the left forefinger in the rectum, to protect that structure, and cut upwards in the median line in the direction of the urethra. If the extravasation is considerable, other incisions should be made. Over the incisions place a poultice, sprinkled with some antiseptic. To keep up the strength, give abundant nourishment, tonics and stimulants.—C. B. Keetley.

URINE, Incontinence of.—Differs very much in cause and treatment according as it occurs in children, in hysterical young people, or in adults. *Causes.*—1, In children: either wilful laziness or a genuine disease, probably partial anæsthesia of bladder. More remote causes are worms, calculus, and struma; 2, in hysterical girls: *vide* causes of hysteria; 3, in adults; a distended state of bladder, the result of paralysis. Those cases in which the urine can only be retained in the bladder for a short time may be classed with Irritability of the Bladder, *quod vide.* *Treatment.*—1, Of incontinence in children: remove the cause; treat the patient kindly, rather encourage than frighten him; avoid corporal punishment in children; flannel clothing at night; wake the child every three hours to micturate; try cold douche to spine every morning. Extractum belladonnæ gr. 1-8th, or tinct. belladonnæ m x ter die. Tonics: strychnine, cantharides, chloral at bed-time. For hysterical incontinence, treat the hysteria. Cold sitz baths. For incontinence from paralysis, see Bladder, Paralysis of. Incontinence also arises from enlargement of middle lobe of prostate. See Prostate, Hypertrophy of.

URINE, Suppression of—*Natural History.*—A complete or partial suspension of the functions of the kidney, by which the quantity of urine is greatly in defect, or its secretion entirely suppressed. There may be some pain in the back, or some irritability of the bladder; the patient becomes anxious and restless, till at last the brain is oppressed, and he dies comatose. In other cases there is nausea, hiccough, and the body exhales an urinous odor. When the suppression is less complete, and depends on an affection of the bladder, the local sufferings of the patient, the forcing of the bladder, the tenesmus, and the general irritation are most severe and distressing.

The time during which the urine may be suppressed, and yet the patient recover, is various. In hysteria the urine is often suppressed for three or four days—three, four, to ten days are the extremes. Children when teething may sometimes void only a few drops of urine, and that at several hours' interval. The urine passed at such times is extremely high colored, stains the linen, and is passed with great pain, the child crying bitterly as it scalds the surface over which it flows.

Treatment.—When suppression does not depend on any morbid condition of the blood, and is primary, the patient should be placed in a warm bath, and be purged by substances that act on the kidney, as the neutral salts. Indeed, if the case be slight, purging by any cathartic is sufficient. If this method should not succeed, m x. to m xxx. of the tinct. cantharides should be tried every four or six hours, according to the urgency of the case. Belladonna is also a useful remedy, and so is digitalis applied as a fomentation of the fresh leaves over the abdomen; or an ounce of the tincture may be added to a warm linseed poultice; or the dried leaves may be made into a poultice, to which half an ounce of the tincture may be added. It is chiefly cases in which the pulse is rapid that digitalis is suitable; and the urine will not begin to flow till the digitalis has reduced the action of the heart. ℞. Tinct. Digitalis, m v. to m x.; Spr. Æther nit, m xxx.; Liq. Ammon-Acet., m lx.; Aq. *f* ℥ i.; misce. Such a draught may be taken every three or four hours.—WILLIAM AITKEN.

URTICARIA.—*Definition.*—A disease the chief symptoms of which is the production of wheals on the skin, causing great irritation, usually unattended by any constitutional symptoms, but sometimes by fever, pain in the epigastrium, and headache.

Symptoms.—The eruption makes its appearance at the same time as any constitutional symptoms which exist, and consists of a quantity of wheals. These vary greatly in size, in quantity, in shape, and in color, but the difference in the variation in color is due to their being in different stages of development. As a rule they appear first as red elevations, which increase in size, becoming white in the centre with red margins. They may occur on any part of the body, and although each individual wheal does not last many hours, a succession may make their appearance for weeks or months. They are accompanied by a severe itching or stinging sensation of the part, and constitutional symptoms may or may not be present.

In some individuals a condition of skin exists which may fairly be considered to result from an urticarial diathesis.

Several forms of urticaria are recognized.

Urticaria Febrilis.—In this form the eruption is preceded by shivering, headache, furred tongue, and vomiting. Soon a number of slightly raised wheals appear over the greater proportion of the body, and usually begin on the wrists and neck. These come and go rapidly, and the itching is intolerable, so much so that it is impossible not to rub or scratch them. Wherever the skin is touched fresh wheals appear, till in this way the surface is more or less covered. From the scratching the skin becomes excoriated, but desquamation does not occur at any time. The irritation is always worse at night.

Urticaria conferta is a chronic variety of the disease, in which the wheals are abundant, but limited to one or two localities.

Urticaria evanida is also a chronic form, in which the wheals come and go rapidly.

Urticaria perstans is a variety in which the eruption continues without changing for some weeks, and may perhaps be the same form which has been well called by Dr. Alfred Sangster urticaria pigmentosa, in which the wheals last for years, leaving a deposit of pigment, which causes a mottled appearance on the skin.

Urticaria tuberosa is rarely seen; in it the wheals are of a larger size than in the others, and it occurs in persons of weak constitution.

Urticaria miliaris, U. vesicularis, U. bullosa, are described and so called because vesicles or bullæ form on the surface of the wheal. They are extremely rare.

In urticaria papulosa the wheals are so small as to resemble papules. Hebra says that they increase in size, but later in the disease diminish again.

Diagnosis.—Urticaria is easily distinguished from the erythemata by the more diffused character of the eruption and the difference in the site, by the absence of local irritation in erythema, by the urticarial wheals being white in the centre with red margins, and more raised than the erythematous patches; from measles and scarlatina by the absence of coryza and sore throat in urticaria, and its lowness of temperature, and by the different courses these diseases run; from erythema nodosum by the presence of itching in urticaria and heat and pain in the former.

The ease by which the rash is excited in certain varieties of urticaria by the slightest irritation of the skin is often a useful diagnostic sign.

Urticaria often arises from the indigestion of some special article o food, such as muscles, oysters, cucumbers, mushrooms, etc., and even cold water; but in many persons it arises without any apparent cause. It is undoubtedly affected by season, in some being worse in cold than in hot weather. The young are more liable to it than the old, and it is occasionally associated with irregularities of menstruation, pregnancy, the presence of parasites in the alimentary canal, and arises very frequently from the irritation caused by the bites of fleas, bugs, etc.

Prognosis.—Urticaria is not a fatal disease. As a rule an attack passes off in a few days, but it may be extremely obstinate and resist all forms of treatment.

Treatment.—If a cause, either internal or external, can be found for its existence, it should be at once removed.

In acute urticaria it is well to begin with an emetic or purgative, or both. In both acute and chronic forms it is important to diet the patient carefully, paying particular attention to avoid his having indigestible food, salt meat, pork, etc. The bowels should be regulated and the patient kept cool. With a view to allay irritation, sponging the skin with cold water should be adopted. Saline baths and lotions are useless, but washing with weak vinegar is agreeable, and should be persisted in if the irritation be severe. Aconite has been given internally with doubtful benefit, but arsenic is certainly of value in some of the more persistent forms of the disease.—MALCOLM MORRIS.

UTERINE CERVIX—*See Cervix Uteri.*

UTERINE OS—*See Os Uteri.*

UTERO-VESICAL FISTULE—*See Fistula, Utero-Vesical.*

UTERUS, Absence of.—*Definition.*—Complete, very rare; occasionally rudiments of the organ are to be detected.

Causes.—Congenital.

Symptoms.—Amenorrhœa. If ovaries are present, sexual appetite may exist.

Signs.—Examination by touch, by sound in bladder and finger in rectum (or hand if necessary) failing to detect the organ.

Prognosis.—Unfavorable.

Treatment.—None.—HEYWOOD SMITH.

UTERUS, Abscess of.—*Definition.*—Suppuration in the walls of the uterus. A rare sequela of metritis.

Causes.—Change of inflammation to suppuration unknown.

Symptoms.—After those of metritis those of suppuration, rigors, nocturnal rise of temperature.

Signs.—Bulging of an elastic swelling in the uterine wall.

Diagnosis.—Difficult; differentiate swelling from that of cyst by the symptoms.

Prognosis.—If accessible, favorable.

Treatment.—Free incision.—HEYWOOD SMITH.

UTERUS, Atrophy of.—*Definition.*—Abnormal smallness of uterus.

Causes.—Congenital. Hyperinvolution.

Symptoms.—Spammenorrhœa; (?) sterility.

Signs.—Sound reveals an abnormally short canal.

Diagnosis.—By sign, as above.

Prognosis.—Unsatisfactory.

Treatment.—By stimulation of ovaries, marriage, galvanic stem.—HEYWOOD SMITH.

UTERUS, Anteflexion of—*Definition.*—A flexion forwards of the body on the cervix; the degree of flexion may vary from a slight curve, the persistence of the fœtal type, to such an acute flexion as may present even less than a right angle. In anteflexion the cervix may lie in its normal direction, or be retroverted so as to throw the os forwards towards the pubes. It is more frequent in the unmarried and sterile.

In some cases, an imperfect examination may lead the practitioner to think he has a case of normal direction with a fibroid of the anterior wall or a case even of retroversion.

Causes.—Congenital; sudden strain or falls, probably associated with a full rectum; loss of tone in the anterior wall of the uterus, endometritis, tumors in the anterior walls of the body or fundus, abdominal tumors, fecal accumulation, tight lacing, pelvic cellulitis binding down the fundus, shortness of round ligaments.

Symptoms.—Frequent desire to micturate, described by patients as "irritability of the bladder;" obstructive dysmenorrhœa. If the flexion is acute, the anterior lip suffers hyperæmia, and not unfrequently areolar hyperplasia, for the symptoms of which see *in loco* Sterility.

Signs.—The cervix may appear to the touch normal, or it may be found lying backwards with the os pointing forwards. If the finger be now carried upwards along the anterior aspect of the cervix, a sulcus will be felt at the junction of the body with the cervix, more or less deep, and anterior to this sulcus a swelling firm as of uterine tissue will be felt. By the bimanual or conjoined examination the exact form of the uterus can be made out. In order to prove the swelling to be the fundus, the uterine sound must be passed. In order to do this, it is often necessary to bend the sound into a curve more or less marked according to the shape of the uterus as described by the finger. Usually there is some constriction of the internal os.

Diagnosis.—The swelling in front of the cervix may be due to a fibroid tumor projecting forwards; the passage of the sound will show whether the uterine canal is straight or otherwise. If the sound passes in the normal direction, the probability is that the swelling anterior to the point of the sound is a fibroid; if, however, the sound passes into the swelling, it is the fundus uteri. A fibroid may exist in the posterior aspect of the body, which will then be detected by the conjoined examination.

Prognosis.—In the unmarried and sterile, difficult of cure; more easy in multiparæ. When the flexion is rigid, and the uterus on the withdrawal of the sound immediately returns to its abnormal curve, the cure is difficult. So also when the uterus lies high in the pelvis.

Treatment.—When the flexion is not very rigid and the uterus is not tender, replacement by means of the sound, every week or oftener, may effect a cure. If endometritis is the cause, the patient should lie supine until the endometritis is cured. The rectum should be kept empty, and perhaps the bladder more often full. With regard to the use of extrauterine pessaries, I must run the risk of being in the minority when I state that they are rarely of much use in maintaining a strongly flexed uterus in the normal position. Undoubtedly there are cases that are cured by a judicious choice of some anteflexion pessary, as the cradle of Graily Hewitt properly formed; but I unhesitatingly say that the results are by no means satisfactory: for, as a rule, the supporting part of such pessaries lies in the sulcus formed by the angle at the junction of the cervix with the body, and forms a sort of crutch over which the uterus leans, as it were, and remains in its bent condition. Cutter's pessary will be found of great service in many cases that cannot bear intrauterine treatment. The only instrument that is of real value in the treatment of anteflexion is an intrauterine stem; but it has often been employed without sufficient caution, so that consequent peritonitis or cellulitis has brought its use into disfavor. For the proper employment of the intrauterine stem, the greatest care is requisite. The patient should be kept in bed, the uterus should be prepared by the application, several times if necessary, of leeches to the cervix, until all tenderness is removed; the sound should be passed from time to time until the uterus becomes tolerant of its presence; a stem should be chosen, of vulcanite or glass, or Simpson's galvanic stem, about one-eighth of an inch shorter than the uterine canal, so that the point may not press on the fundus, and then when the stem is passed and the uterus thereby straightened, it is a good plan to insert a Hodge's pessary to keep the whole organ in its natural position. The stem should be at first worn only a few hours at a time, until it can be borne for a few days and then weeks. It should be removed just before a period. until after a time it may be allowed to remain *in situ* during the catamenia, when in cases of obstructive dysmenorrhœa it will be found, by its keeping the canal straight and patent, to relieve the pain so characteristic of that condition.

Should there exist considerable constriction of the internal os, a speculum should be introduced, and the fibres of the inner os and part of the cervix slightly divided by Sims' straight knife. This operation may be supplemented in some cases by the use of the uterine dilator. When, however, the flexion is strong and the uterine wall thick, the antero-posterior division of Marion Sims holds out the best prospect of straightening the canal. The posterior aspect of the cervical canal is first of all incised, and the incision kept patent by the passage of the sound (not a stem) until the wound is healed; then the finger is to be passed up outside the cervix in front until it rests on the sulcus, and the straight knife being then carried up through the internal os, a cut is to be made through some of its fibres directly forwards towards the tip of the finger, which will be the guide to prevent a too deep incision, which might prove fatal. By this means an artificial straight canal is formed, and the subsequent wearing of an intrauterine stem may complete the cure. All operations for the cure of anteflexion are contraindicated in those cases where there exist the products of former inflammation.—HEYWOOD SMITH.

UTERUS, Anteversion of.—*Definition.*—The condition of the uterus in the fœtus is normally slightly anteverted or even anteflexed, so that the uterus must lie at an angle with the plane of the horizon less than the normal angle to be accounted anteverted.

Causes.—Areolar hyperplasia, fibroids in the anterior aspect of the fundus, violent efforts, tight lacing, relaxation of utero-sacral ligaments, cystocele.

Symptoms.—Dysuria and frequency of micturition, aching pain over the pubes, oceasionally difficulty in defecation from the pressure backwards of the cervix ; exertion produces pain ; inability to walk.

Signs.—The uterus is felt to be lying more horizontal than natural ; the sound shows the direction of the cavity.

Diagnosis.—By signs as above.

Prognosis.—Favorable.

Treatment.—Rectification of position, where uncomplicated ; if dependent upon areolar hyperplasia or endometritis the malady must be remedied before any attempt is made at replacement. Replacement is best performed by the fingers alone ; if the version is of long standing and the uterus is free from congestion or inflammation, and also the periuterine connective tissue, the sound may be cautiously used. To retain the uterus in its normal position, the dorsal decubitus for several hours daily, prolonged retention of urine (?), removal of pressure of clothes ; pessaries, as airball, Thomas's anteversion pessary, Cutter's ditto. Elytrorrhaphy. Sims's operation consists in denuding a portion of the vaginal wall just anterior to the cervix, and extending more or less forwards to within about three-quarters of an inch of the posterior margin of the urethra, and bringing the edges together by sutures introduced laterally. The operation recommended by Professor Stoltz, and practiced for the first time in England in 1875, by the author, with success, consists in denuding a circular portion of the anterior wall of the vagina, and then passing a single suture of silk round the margin of the wound. The suture should be inserted near the urethra anteriorly, and passed in a running stitch rather deeply and about one-eighth of an inch from the margin of the wound, in the same way as the mouth of a bag has a string run along it with the view of closing it ; the end of the suture is brought out near the point of insertion, and the suture is then drawn tight, which closes up the wound into a small puckered point ; and if union should take place primarily, the anterior portion of the vagina is thereby considerably shortened, and the cervix being pulled forwards the uterus is made to assume a more normal position.—HEYWOOD SMITH.

UTERUS, Cancer of.—Malignant disease of the uterus manifesting itself in various forms. Factors—(1) Hereditary tendency ; (2) Local manifestation ; (3) Secondary affections.

Scirrhus.—*Definition.*—Malignant disease of the uterus wherein the fibrous elements predominate, rare. It commencces with hard deposit, with absence of symptoms that would lead to the diagnosis of interstitial hypertrophy or areolar hyperplasia. After the hard condition has existed for some little time, it breaks down and becomes converted into excavating carcinoma. *Causes.*—Hereditary tendency, middle or advanced life, frequent pregnancies, mental depression, hard life. *Symptoms.*—At first but slight, with leucorrhea and hæmorrhage ; then pain through the pelvis ; tenderness on pressure, menorrhagia and metrorrhagia ; watery and offensive discharge, debility, and afterwards the characteristic cachexia. *Signs.*—Scarcely any of true scirrhus ; cervix feels peculiarly hard and *nodulated. The* sensation to the touch differentiating scirrhus from non-malignant induration of the cervix is that in cancer the tissue is felt hard even on the very surface, like wet india rubber, whereas in areolar hyperplasia the hardness is felt to be below the surface, submucous. By microscope, stroma, alveoli, cells. *Diagnosis.*—Often difficult, but having regard to the history of the case, and with due care in the examination as to hardness (see above), a correct diagnosis should be arrived at. *Prognosis.*—Unfavorable. *Treatment.*—Amputation : relieve pain, and sustain health.

Excavating Carcinoma.—*Definition.* Destructive ulcerative stage of scirrhus. *Causes.*—Final unknown. *Symptoms.*—Often at first painless until considerable advance has been made, when the pain becomes stabbing and severe through hypogastrium. Discharge bloody, puriform, watery, and offensive. Cachexia marked by loss of flesh, yellowish tinge of skin, and depression of the vital powers. Progress rapid, affecting contiguous tissues. *Signs.*—Uterus fixed ; a more or less ragged excavation in the cervix uteri ; the excavation characterized by defined, irregular, hard edges, with a cavity irregular, nodulated, hard, and occasionally friable. *Diagnosis.*—From benign ulceration by fixidity of uterus, by rapidity of extension, by the peculiar hardness of the ulcerative surface, and by the general symptoms. *Prognosis.*—Unfavorable. *Treatment.*—Scrape the cavity as clean as possible from the malignant surface growth, and apply the actual cautery freely from time to time ; or potassa caustica, or bromine, with the view of producing a deep slough and so reaching more healthy tissue ; or apply frequently plugs saturated with the glycerin of tannic acid, having the portion in apposition to the excavation previously dipped in strong carbolic acid.

Vegetating Carcinoma.—*Definition.* A friable, somewhat hard mas- (resembling cauliflower more than the real cauliflower excrescence) growing from the cervix, and projecting more or less into the vagina. It may produce spots of similar growth on the vaginal wall by contiguity *Causes.*—Unknown ; probably neglected epithelioma. *Symptoms.*—More painful at first than the latter variety ; discharge less bloody, more pure form, not so offensive at first. *Signs.*—Uterus not so soon fixed. May, felt isolated, occasionally growing from only one lip of the uterus ; very friable, portions being easily separated by the finger. *Diagnosis.*—From true cauliflower excrescence by presence of cachexia and pain, and discharge less watery. *Prognosis.*—Unfavorable. *Treatment.*—Complete amputation of the mass and free application of the actual cautery ; subsequent treatment as in latter variety.

Epithelioma.—*Definition.* Malignant growth at first in the form of a patch on the lips of the womb, afterwards ulcerating. *Causes.*—Not improbably developed in some cases from extensive neglected granular inflammation of the cervix uteri. *Symptoms.*—Backache, bearing down pain, metrorrhagia, discharge puriform and bloodstained. *Signs.*—Uterus at first movable ; growth somewhat hard, coarsely granular, patch raised above surrounding tissue, red, easily made to bleed. *Diagnosis.*—From granular inflammation of the cervix by more severe pain ; occasionally more bleeding ; cervix not necessarily much increased in bulk. Afterwards it may become a vegetating carcinoma. *Prognosis.*—Not always unfavorable. *Treatment.*—Amputation of the cervix through healthy tissue ; this not unfrequently results in cure.

Cauliflower Excrescence.—*Definition.* Not true cancer, cancroid, very rare ; a growth not hard and friable as vegetating carcinoma or epithelioma, but consisting of a highly vascular tissue (papilloma), granular, shreddy, not invading the vagina, growing out from the os uteri, not composed of so-called cancer-cells. *Causes.*—Unknown. *Symptoms.*—Discharge of bloody water, afterwards bleeding ; spanæmia, disorder of general health. *Signs.*—Growth felt softish, lobulated like placenta without tenderness; bright flesh red color; no infiltration; uterus not fixed. *Diagnosis.*—By microspical examination not giving usual characteristics of cancer; from polypus by greater softness and ready bleeding when touched; from vegetating cancer by its mobility and softness, symptoms of spanæmia, and not the cachexia of cancer. *Prognosis.*—If it arises from one portion of the lip of the uterus and has a narrow base, sometimes favorable; if advanced, unfavorable. *Treatment.*—Removal, and actual cautery.—Heywood Smith.

UTERUS Catarrh of.—*Definition.*—A defluxion of a glairy nature from the cervix uteri, not necessarily associated with marked endocervicitis.

Causes.—Cold, hyperæmia of the cervix, excessive coitus.

Symptoms.—A feeling of weakness, with slight backache.

Signs.—Leucorrhœa (colorless).

Diagnosis.—From endocervicitis by the absence of a red granular condition of the canal or lips.

Prognosis.—Favorable.

Treatment.—Rest; tonics, iron, quinine, and zinc, ergot; intrauterine injection of carbolic acid and glycerine or iodine.—Heywood Smith.

UTERUS, Fibro-cyst of.—*Definition.*—A fibrous tumor wherein a cyst or cysts have formed; cysto-fibroma, cysto-sarcoma. More usual in the subperitoneal variety.

Causes.—Unknown.

Symptoms.—Similar to those of fibrous tumor.

Signs.—In addition to the signs which are similar to those of fibrous tumors there is a more or less distinct sensation of the presence of fluid. Aspiration reveals its presence in some parts of the tumor.

Diagnosis.—From pregnancy by the absence of mammary signs by menorrhagia, and by time; from ovarian dropsy (*vide in loco*); from fibrous tumors by fluctuation, and by, as a rule, increased size and rapidity of growth.

Prognosis.—Unfavorable.

Treatment.—Aspiration; removal of tumor.—Heywood Smith.

UTERUS, Fibrous Tumor of.—A swelling of some portion of the uterus, consisting mainly of fibrous tissue; fibroma, myoma, or myofibroma.

Subperitoneal Fibroid.—*Definition.*—A fibrous tumor projecting more or less from the external surface of the uterus, either sessile or pediculated. *Causes.*—Unknown. *Symptoms.*—Pain in pelvis, with sense of weight and bearing down; some menorrhagia, difficulty of defacation, and symptoms of retroversion when the tumor is tilted backwards; frequency of micturition when it presses forward on to the bladder. *Signs.*—Swelling felt by abdominal palpation and bimanual examination; tumor, if pediculated, felt to be partially movable independently of the uterus. Uterine cavity not increased. *Diagnosis.*—From cellulitis by mobility; from hæmatocele by absence of sudden symptoms; from flexions by uterine sound; from ovarian tumors, difficult, by some mobility with the uterus; where ovarian tumor is adherent to uterus, often impossible; from fæces by indentation of latter. *Prognosis.*—If of slow growth, not unfavorable. *Treatment.*—Where so large as to threaten health, removal by abdominal section.

Intramural or Interstitial Fibroid.—*Definition.*—A fibrous tumor situate in the walls of the uterus. *Causes.*—Unknown (subinvolution ?). *Symptoms.*—Menorrhagia, irritability of bladder and rectum, pain in pelvis dysmenorrhœa, leucorrhœa. *Signs.*—Uterus felt enlarged, cavity elongated, and curved by bulging of the wall in which the tumor is situate

Diagnosis.—From subperitoneal (see above); from intrauterine (see below). *Prognosis.*—If of slowth growth not unfavorable, but less so than the subperitoneal variety. *Treatment.*—Dilatation of cervix kept up, and the administration of ergot with the view of projecting the tumor towards the inner surface of the uterus, when treat as below; chloride of calcium, gr. 15.

INTRAUTERINE FIBROID.—*Definition.*—A fibrous tumor springing from the inner wall of the uterus, projecting more or less into its cavity; sessile or pediculated. *Causes.*—Unknown. *Symptoms.*—Menorrhagia and metrorrhagia, according to size, irritability of bladder and rectum; pain, bearing down, intermittent, as of labor; glairy leucorrhœa, dysmenorrhœa. *Signs.*—Uterus enlarged and hard, cavity elongated and more or less curved by the protruding tumor, that side of the uterus being bulged outwards opposite to that from which the tumor springs; os sometimes patent. To more thoroughly explore the uterus, the cervix must be dilated with tents in order that the finger may be passed into the uterus to feel the tumor. *Diagnosis.*—From subperitoneal and interstitial tumors by the greater length of the cavity and by its tortuous direction; from simple flexions by the sound; from ovarian tumors by the length of the uterine cavity; from pelvic hæmatocele and cellulitis by the history. *Prognosis.*—If accessible, favorable; if the cervix is long and narrow, guarded as to cure. *Treatment.*—Fibrous tumors may remain stationary, especially after the menopause; or they may retrograde; they may be spontaneously protruded from the os as polypi, or even become detached and expelled; they may slough. Pregnancy may alter their growth, and the process of involution may lessen them. Where removal is contra-indicated, relieve expulsive pains by opium; relieve pressure by pessary; lessen metrorrhagia by acid tonics, Indian hemp, gallic acid, turpentine, astringent plugs, or intrauterine injections of astringent fluids. Often the expulsive pains and metrorrhagia are greatly lessened by free division of the cervix. This may be done by the ordinary hysterotome, by the knife, or by my father's sliding hysterotome, which divides the whole thickness of the cervix easily and rapidly. For cure, removal—by (1) induced extrusion; (2), ecraseur; (3), enucleation; (4), produced sloughing, or (5), hysterectomy.

1. *By Induced Extrusion.*—The os and cervix uteri must be dilated freely by tents. At first it is best to introduce a sufficiently long laminaria tent, and on its removal to introduce several others together or sponge tents of increasing calibre; if the cervix is thus kept patent, and the fundus uteri induced to contract by ergot (intrauterine pessaries) or by the hypodermic injection of ergotin (gr. 2), the uterus may be the induced pains, as in labor, gradually extrude the tumor through the os, when it is to be treated as a polypus (*vide infra*). And here some directions may by given for the safe employment of tents; for without due care their use may be followed by severe symptoms, and even death from septic peritonitis. No teht should be introduced soon after an incision of the cervix, nor until the wound has healed, the parts being in the meantime kept apart; for the wound affords a point of absorption for the pent-up fetid discharge that accompanies the presence of a tent. For the same reason no incision of the cervix should be made immediately on the removal of a tent, nor until the parts have been thoroughly cleansed from all offensive discharge. No tent should be left in the uterus more than 12 hours, nor so long should the temperature rise or other symptoms or mischief supervene. Severe pain on the introduction of a tent should put the operator on his guard as an indication that mischief is at hand. No tent should be introduced on the removal of the former one, before the parts are thoroughly syringed with Condy's fluid and water, or a solution of carbolic acid, 1 in 20 or 40.

If these precautions are neglected, the use of tents becomes a most hazardous proceeding. If incision of the cervix is had recourse to, great care should be taken previously to ascertain the exact direction of the canal of the cervix and the relation of the tumor, lest the cavity of the peritoneum should be laid open.

2. *By the Ecraseur.*—After the cervix uteri has been fully dilated and the tumor felt by the finger, it is to be seized with a pair of vulsellum forceps, dragged downwards with care, and the loop of a steel wire ecraseur, or what is better, the loop of the galvanic ecraseur, guided over it and the tumor cut through; by careful traction it may then be removed. It, however, occasionally happens that the delivery of a tumor that has been cut loose becomes a matter of extreme difficulty. In such case the employment of my jointed shark's-toothed forceps will be found of great service. They are made with the blades separable like midwifery forceps. Each blade is to be introduced over the tumor as if over a fœtal head, and when in a position to be locked; they then afford a means of extraction of considerable power. It not unfrequently happens that the tumor is of too great a size even to be removed by the above method. The loop of the ecraseur should then again be applied and the tumor cut through, if necessary, more than once, and the several pieces removed. Ergot should then be given, and the uterus daily syringed with some disinfecting fluid. Should there be much hæmorrhage, a plug of matico should be inserted into the uterus for a few hours.

3. *By Enucleation.*—For enucleation to be safely performed, it should be accomplished at one operation. If this is neglected, the vitality of the tumor being greatly interfered with, a slough is produced which may prove fatal. After the cervix has been well dilated as above, the hand should be passed into the vagina and the fingers into the uterus; the capsule of the tumor should be cut through; or, if the tumor projects far into the uterus, the fingers—or, if the upper part of the tumor cannot be reached, Marion Sims' hook for fibrous tumors—should be passed over the tumor, and its base somewhat torn through. Sims's hook should then be fixed into the tumor, and, steady traction being made, the tumor should be shelled out from its site, gradually and altogether with the uterine contractions, which should be stimulated with ergot, external kneading or galvanism, the tumor gradually pulled downwards, and its final pedicle severed with scissors or the ecraseur. Proceed afterwards as above.

4. *By Produced Sloughing.*—There are two conditions of fibrous tumors of the uterus where this method of cure has been recommended as applicable: one where the tumor is sessile and presents considerable difficulties to the process of enucleation; and the other where the uterus is so enlarged and misplaced by a tumor which may be mainly interstitial, as that the os uteri is tilted upwards and jammed against or above the os pubis. In the former case, it is suggested to bore a deep hole into the most depending portion of the tumor through the os uteri by either the actual cautery or by potassa fusa, opening thereby the capsule of the tumor, in order that, the tumor being partially liberated and made to disintegrate, the uterus may by its contractions gradually enucleate the tumor. In the latter, it is recommended to, in fact, bore a new os uteri, as it were, by the actual cautery through the most depending portion (the posterior) of the uterus itself. It has been successfully carried out, the tumor sloughing and disintegrating has been expelled gradually through the artificial os, and as the tumor thus becomes lessened the uterus assumes its natural position, the os comes down from its former situation, and the hole through which the tumor has sloughed out eventually heals up. It is, perhaps, scarcely necessary to insist upon the great care and watchfulness that is *required during* the whole process by the frequent injections of solutions

of carbolic acid, or of iodine, or of Condy's fluid and water, to guard against septic peritonitis.

5. *By Hysterectomy.*—[This term is more accurate than that more usually employed of "hysterotomy" or "gastrotomy;" as "ovariectomy" is more accurate than "ovariotomy,"] Where a case of fibrous tumor of the uterus is not amenable to cure by any of the former methods, and where the presence of any or all of these three conditions—pain, hæmorrhage, and rapid growth—render the patient's life unendurable, or prevent her exercising her necessary avocations, the question arises as to the advisability of the total extirpation of the uterus and its morbid contents; bearing in mind that the case is one that will allow of a more or less healthy cervix being left as a stump, as the attempted removal of the cervix also would be attended with too great a risk, owing to its relation with the bladder. It is beside the mark to argue that the operation is formidable, perhaps the most-formidable in uterine surgery,—for a similar argument was brought forward on the introduction of ovariotomy. The duty of the medical man is to save life and relieve distress; and in fact the mortality after removal of the uterus is not greater than obtained in the early history of the latter operation. On such a case presenting itself, the cervix being of fair length and health, and the uterus apparently free, the patient should be prepared for the operation by rest and tonics, and a spare but nourishing diet. The operation requires the utmost care, patience, and preparedness for emergencies. A sufficiently long incision is to be made in the abdominal wells as in ovariotomy, care being taken not to go too near to the bladder, and if the tumor be not too large, it is to be drawn forwards out of the wound; a strong curved needle with an eye at its point is then to be passed through the upper part of the cervix uteri, and double strong wire drawn back through the point of puncture; each ligature is then to be secured by the serre-nœud of Dr. Cintrat, drawn tight and twisted; the uterine tumor is then to be cut away, and the pedicle secured by the serre-nœuds to be fixed in position at the lower end of the wound, which is to be closed in the usual way. Should, however, the uterine tumor be too large to be drawn out at the incision without the latter being enlarged to a dangerous extent, wires must be passed through the tumor so as to constrict a portion of it as above described, and this portion cut away; the remainder then is to be treated by being transfixed as above described (fresh serre-nœuds being employed), until the whole is removed; or the stump may be transfixed and tied with strong silk, and dropped into the pelvis. The patient subjected to this operation must be most carefully tended, in order to render recovery safe.—HEYWOOD SMITH.

UTERUS, Hypertrophy of.—*Definition.*—True enlargement of the uterus not associated with morbid deposit, rare.

Causes.—Congenital, rare; subinvolution.

Symptoms.—Sensation of weight and bearing down, backache, leucorrhœa.

Signs.—Uterine cavity longer than normal; tendency to prolapsus.

Diagnosis.—By absence of other signs of morbid growth; by ascertained length and weight of uterus.

Prognosis.—Recovery tedious.

Treatment.—If congenital, none. If from subinvolution, scarification of cavity of uterus and cervix; nitric acid by Playfair's probe; tonics with ergot.—HEYWOOD SMITH.

UTERUS, Inertia of.—*Definition.*—That condition of the parturient uterus where it strikes work, as it were, through weariness or shock.

Causes.—Prolonged labor from constitutional weakness, or following frequent abortions; from impaction of the head, from cross presentation, from nervous or mental depression.

Symptoms.—The pains, which have hitherto been regular and effective, become shorter in duration at longer intervals; the head makes no advance; the patient becomes low, restless, and moans, with a sunk expression.

Signs.—Pulse small, frequent, and weak, and the pains seem gradually ceasing.

Diagnosis.—If uncomplicated with accidental hæmorrhage, not difficult.

Prognosis.—Often unfavorable.

Treatment.—Food, stimulants ergot and quinine; deliver with forceps. —HEYWOOD SMITH.

UTERUS, Inflammation of Mucous Membrane of Body of—*See Endometritis.*

UTERUS, Inflammation of Parenchyma of—*See Metritis.*

UTERUS, Inversion of.—*Definition.*—A flexion of the uterus in which the organ is more or less turned inside out. It may be partial or complete. In partial inversion the fundus may be inverted, but may not be protruded through the os uteri; or the fundus may pass through the os uteri, yet the cervix may not be completely inverted; or there may be complete inversion where the whole uterus and cervix may be entirely inverted; in the latter case the inverted organ may protrude at the vulva.

Causes.—Relaxation of the walls of the uterus followed by effort, traction on the funis at delivery, tumors of the fundus uteri, polypus, or by sudden uterine contraction in parturition.

Symptoms.—Faintness, hæmorrhage, collapse; when chronic, periodic (catamenial) hæmorrhage, dragging pain in back and loins, difficulty in micturition.

Signs.—On examination the finger encounters a tumor in the vagina, encircled at its base by the os uteri in cases of partial inversion, but when the inversion is complete no surrounding ring is felt save only the vaginal roof. In cases where the fundus does not come through the os the diagnosis can only be made out by a most careful examination. In such cases the shortness of the uterine canal all round the tumor, together with a depression in the situation of the fundus as revealed by the bimanual examination, will help to a correct diagnosis. In the more frequent cases where the fundus passes through the os uteri, the following signs are diagnostic. The inner surface of the inverted uterus feels smooth and differs in consistency from most morbid tumors; and per speculum the lining membrane of the uterus may be recognized. A sound passed into the bladder with its point directed backwards is felt by the finger in the rectum, which could not be done if the fundus intervened. Then the uterine sound should be inserted into the space between the encircling cervix and the fundus and carefully passed all round the tumor, when it will be found that there is only a short furrow existing where there should be the uterine canal.

Diagnosis.—From polypus by the signs as above. In cases of polypus the uterine sound can be passed into the uterine canal by the side of the polypus.

Prognosis.—If the inversion has not been followed by inflammation producing adhesion of the peritoneal surface, favorable.

Treatment.—Reversion. Various methods have been had recourse to, such as prolonged pressure by instruments, incision of the constricting cervix, or even by abdominal section combined with pressure from below, the object of opening the abdomen being to get at and dilate the cuplike depression at the seat of flexion. But in the majority of cases patience combined with skilled manipulation will suffice. The patient should be placed on her back and fully under the influence of chloroform, one hand introduced into the vagina, and by the other counter-pressure is to be made on the indented uterus through the abdominal walls over the pubes. It will be necessary, owing to the cramp from the constrained position, frequently to change hands during the operation. The fundus being grasped by the hand, the effect should first of all be made, by squeezing, to empty the fundus of blood, and so render it more flaccid; after this has been persevered in for some time the attempt at reversion may be made. It is usually said that attempts should be made to push back first that portion that is last inverted, viz., that portion near the cervix; but owing to the unequal length of the fingers this method of procedure is difficult. Then it has been recommended to keep up firm pressure in the middle of the fundus until a depression is made, and then to follow this up; but this method often fails, as the pressure in the middle of the fundus necessarily causes it to bulge more laterally, and so prevents the fundus thus swollen passing through the cervix.

Undoubtedly the best plan is that of Dr. Noeggerath, of New York, but alluded to by scarcely any writer. Counter-pressure being kept up outside (or occasionally advantage may be taken of the promontory of the sacrum and the uterus pressed against it), the insertion of one of the oviducts is to be felt for, and steady pressure made upon it with one finger. As the uterine walls are thinner in this situation than at any other point, a depression is sooner or later obtained; and if this advantage is gradually followed up, the uterus will usually soon be reverted. It is by far the most scientific method of procedure : for as the insertion of the oviduct is situated laterally, any gain of reversion is first made in the portion that intervenes between the insertion of the oviduct and the cervix; and the reinvagination of the cervix once having been begun, steady pressure will soon carry the whole of the organ upwards in an oblique direction. If this method be carefully followed, there are few cases that will not ultimately yield.

When inversion happens during the third stage of parturition, the whole fundus, together with the placenta, should be firmly grasped and at once replaced, and the placenta subsequently removed by expression.

In cases where reposition is impossible in chronic inversion, it may be necessary to amputate the uterus.—HEYWOOD SMITH.

UTERUS, Lateroflexion of.—*Definition.*—A flexion of the body of the uterus on the cervix towards the right or left; uncomplicated, rare. It is usually associated with anteflexion or retroflexion; and then is better described as right or left anteflexion, or right or left retroflexion.

Causes.—Inflammation with subsequent contraction, rarely accident.

Symptoms.—Are not well marked; ovarian neuralgia may be produced by pressure on the ovary towards which the flexion inclines.

Signs.—The passage of the uterine sound will alone determine whether a lateral swelling is the fundus, or some other tumor, as the ovary or the deposit of pelvic cellulitis.

Diagnosis.—By signs as above.

Prognosis.—Unfavorable as to cure.

Treatment.—By methods as in anteflexion or retroflexion.—HEYWOOD SMITH.

UTERUS, Mucous Polypus of.—*Definition.*—Polypus usually small, from size of a pin's head to that of a walnut, growing from the edge of the lips of the cervix, covered with mucous membrane.

Causes.—Irritation of the lips of the uterus, chronic cervicitis.

Symptoms.—Although small, they give rise to aching pain in sacrum, occasionally dysmenorrhœa, lencorrhœa glairy, and some little bleeding.

Signs.—If very small they are with difficulty felt, owing to their softness, but a skilled touch will generally detect them, and they are at once seen per speculum.

Diagnosis.—By symptoms and signs as above.

Prognosis.—Favorable.

Treatment.—Removal by torsion or scissors.—HEYWOOD SMITH.

UTERUS, Polypus of.—*Definition.*—A tumor covered by the lining of the uterus, and attached to its interior by a pedicle. They are chiefly fibrous, fibro-cystic, cellular, etc.

Causes.—Unknown in their origin. Polypi are formed by fibrous tumors situated near the inner surface being acted upon by the contractile tissue of the uterus, and so gradually projected from the surface until they become pediculated; the uterus then continuing to act, finally extrudes the mass from the os uteri.

Symptoms.—Menorrhagia, metrorrhagia, leucorrhœa, occasional dysmenorrhœa, bearing-down pains (from uterus attempting to extrude the tumor); if tumor large and in the vagina, feeling of fulness there.

Signs.—If the os uteri is closed, the uterine sound reveals a cavity longer than normal, and curved in its direction from the bulging of the tumor. If the os uteri is open, the polypus may be felt protruding or presenting in the cervical canal; or it may be felt occupying the vagina, and its pedicle may be traced to within the os uteri. The polypus may be so large as to completely fill the vagina and render any attempt to reach the pedicle very difficult; or the polypus may protrude at the outlet. If at all strangled, there may be a fetid discharge. Examination produces bleeding.

Diagnosis.—From inversion by the sound passing into the uterus to the normal length or more.

Prognosis.—Natural cure, rare, by strangulation, the polypus falling off at its pedicle; or by sloughing. Favorable by treatment.

Treatment.—When in the vagina, removal by scissors, écraseur, or galvano-caustic ècraseur. Should a difficulty arise in placing the wire of the galvanic ècraseur round the polypus owing to the softness of the wire, I would suggest that the tubes of the instrument be made removable, and that the wire be placed round the base of the tumor, as the ligature in Gooch's canula. If intrauterine, division of the cervix may enable the uterus to expel the tumor; if not, and the symptoms are urgent enough to warrant interference, dilatation by tents, and subsequent removal by ècraseur. This procedure, as all others necessitating the use of tents, is not without risk. Palliative; keep uterus in normal position; rest during catamenia. Ergot, cannabis indica, gallic acid, opium; keep bowels open; tonics; injections and pessaries of tannic acid.—HEYWOOD SMITH.

UTERUS, Prolapsus of.—*Definition.*—Falling of the womb, caused by weight of the organ or relaxation of its supports, as of vaginal walls, of the uterine ligaments. Procidentia uteri, or the tendency of the uterus to be displaced downwards, varies in extent from a slight depression of the organ, either at its normal angle, retroverted, retroflexed or anteflexed, to the state of complete prolapsus, so that the whole organ is external to the vulva.

Causes.—Parturition, and too early assumption of the upright position; ruptured perineum, tumors, hypertrophy, hyperplasia, subinvolution, relaxation of vaginal walls, hæmatocele, violent efforts, falls, cystocele, rectocele, old age.

Symptoms.—Occasionally none; dragging pain in the sacrum, feeling of fullness in the vagina, rectal and vesicle irritation, discomfort in walking, and on any exertion; leucorrhœa, rarely dysmenorrhœa; occasionally mennorhagia from the induced hyperæmia.

Signs.—Uterus felt to be low, or seen protruding more or less from the outlet. Cavity of uterus often elongated.

Diagnosis.—From polypus by the presence of the os uteri; from hypertrophy of the cervix by careful examination; from inversion by the use of the sound.

Prognosis.—If uncomplicated with hypertrophy, tumors, etc., favorable by treatment; if complicated, difficult

Treatment.—If the prolapsus is simple, reposition and retention with a suitable pessary will generally suffice. The pessaries most useful are Hodge's, the simple ring, the ring curved, the air-ball pessary, or Zwancke's pessary, as modified by Dr. Godson; care being taken in the use of the pessaries that they are not too large, as the weight of the uterus tends to force them against the vaginal walls and so produce ulceration, leading to the imbedding of the instrument in the tissue of the vagina, or even ulcerative perforation of the rectum or bladder.

If complications exist they must be remedied; hypertrophied cervixes should be ampututed; areolar hyperplasia of the cervix should be cured; polypi or intrauterine fibroids, should be removed; vaginal astringents by pessaries or injections should be had recourse to, the recumbent posture maintained for several hours daily; ruptured perineum should be closed; and finally elytrorrhaphy, either by Sims' method or Stolz's.—Heywood Smith.

UTERUS, Retroflexion of.—*Definition.*—A flexion backwards of the body of the uterus on the cervix, varying in degree from a slight angle to an acute one. In retroflexion the os and cervix may retain their normal direction, or the whole uterus may be so dislocated that the os may point above the pubes.

Causes.—Parturition, subinvolution, weakening of the wall of the uterus, sudden efforts or falls, fibrous tumors of the fundus, pregnancy, abdominal tumors, constant distension of the bladder, constipation, contraction after pelvic inflammation. Areolar hyperplasia is said to be a cause; it is more often an effect.

Symptoms.—Feeling of bearing down, especially backwards; mechanical difficulty in defecation from pressure of the retroflexed fundus; if the angle of flexion is somewhat acute, uterine tenesmus, occasionally dysmenorrhœa; rarely, from the flexion alone, sterility; leucorrhœa, areolar hyperplasia of the posterior lip with consequent menorrhagia, piles.

Signs.—The os uteri is usually felt to be directed more or less forwards and downwards, the cervix lying more or less backwards; on carrying the fingers along the posterior aspect of the cervix, a sulcus is reached and a swelling is discovered behind the cervix; pressure by the bimanual examination may show this to be probably the retroflexed body, but to determine the question the sound is to be used. It will be found usually to pass upwards and a little backwards, and then more or less directly backwards, or even backwards and downwards, according to the angle of flexion, into the swelling before noticed.

Diagnosis.—From a mass of fæces by the doughy feel of the latter; from fibrous tumors, pelvic cellulitis, hæmatocele, ovarian tumor, by the passage of the uterine sound.

Prognosis.—Generally favorable as to cure or alleviation.

Treatment.—In slight and recent cases the uterus may be easily and carefully replaced by the uterine sound (see Retroversion), or the patient being placed in the knee- shoulder position, two fingers should be introduced along the posterior vaginal wall and slightly separated so as to admit air into the vagina; the uterus can then often be easily lifted out of its abnormal position. A simple Hodge's pessary, or one bent at a smaller angle, may then be introduced as in cases of retroversion, and this procedure may often effect a cure. Dr. Cutter's pessary may often keep the uterus in position when others have failed. It consists of a support of vulcanite, which may be made to rest in either anterior or posterior cul-de-sac, or in cases of prolapsus to sustain the whole uterus. From the internal portion a curved stem passes downwards and backwards round the edge of the perineum, but not touching it, and to the end of this is attached a piece of india-rubber tubing which passes up the natal cleft and is fastened to a waistband. In cases complicated with enlarged cervix or areolar hyperplasia, the diseased condition should first of all be remedied before any attempt is made at replacement; although in some cases where the congestion is not very great, reposition may, by removing the cause of congestion, remove also the flexion. In all cases it is well first to deplete the uterus, in order to guard against inflammation which may arise from interference with a congested uterus. In very obstinate cases where the uterus on the withdrawal of the sound returns at once to its abnormal position, it may be necessary to use such an appliance as Simpson's stem, which being fixed outside over the pubes retains the uterus in one position. Such an instrument should, however, only be used in severe cases, as, the uterus being thereby fixed, and therefore not yielding to the movements of the body, nor to those of respiration, mischief may ensue. Pelvic band. In some cases also it may be necessary to perform posterior vaginal elytrorrhaphy, an operation which, however, does not as a rule produce satisfactory results.—HEYWOOD SMITH.

UTERUS, Retroversion of.—*Definition.*—The uterus maintaining its straight form is inclined more or less backwards, so that the os points forwards, in some extreme cases lying as high as the upper margin of the os pubis, and the fundus pressing backwards into the hollow of the sacrum. The version may also deviate more or less to the right or left.

Causes.—By accident rare; general areolar hyperplasia, subinvolution, congestion, pregnancy, frequent parturition, adhesions from peritonitis or pelvic cellulitis; blows or falls with a distended bladder, fibrous tumors, over-tight bandaging, rectocele, rupture of perineum.

Symptoms.—Rarely none. Pain in the back (sacrum) fixed, discomfort in walking, etc.; pain increased on defecation, with a sensation of impediment; occasionally tenesmus of rectum or bladder, from pressure of the fundus and cervix respectively; dysmenorrhœa, occasional sterility, cystitis. If the version happens suddenly, the pain is often severe, and accompanied with constitutional symptoms

Signs.—Examination detects the cervix lying forwards with the os looking towards the outlet or the os pubis; the fundis is felt behind, but without the intervening sulcus that is marked in cases of retroflexion. The uterine sound confirms the diagnosis.

Diagnosis.—A fibroid in the posterior wall may give to the touch the sensation of a retroverted uterus, but the passage of the uterine sound will demonstrate the real state of affairs.

Prognosis.—If the uterus is not bound down by adhesions, favorable to cure; otherwise if so bound.

Treatment.—Local depletion by leeches or scarification; reposition of the uterus by means of the uterine sound. Although modifications of the sound have been devised with the view of rendering the reposition of the uterus more easy, yet in the hands of a skilled practitioner the ordinary sound, or which is better, the parallel sound, is the simpler instrument. The finger of the right hand should be introduced up to the os uteri, and the practitioner standing behind and above the patient, should then pass the sound up to the os uteri, and having by the touch recognised the malposition as one of probable retroversion, the sound should be passed gently into the uterus backwards. In passing the sound, as great care should be taken as in passing a male catheter, to use no force, but to let the instrument find its way into the cavity of the uterus. The handle, not the uterine portion, should then be rotated through a semi-cone, the forefinger of the right hand should support the cervix, and the sound resting on the interspace between the knuckles of the first and middle fingers (not on the perineum), the handle should be gently and gradually depressed—*i.e.*, brought backwards until the uterus is restored to its normal angle; the forefinger of the right hand should then be shifted so as to embrace the cervix between itself and the sound, and the whole uterus pulled gently downwards until the fundus rests more or less on the os pubis; then while the finger presses the cervix backwards the sound should be removed in a curve forwards, and the cervix pressed backwards towards the hollow of the sacrum and held there for a few seconds. After reposition of the uterus, if the version has been of long standing, it will tend to assume its abnormal position. If the version is due to congestion, or areolar hyperplasia, these conditions must be remedied (*vide in loco*) before a permanent cure can be looked for. Should these conditions be absent or removed by treatment, then means may be taken for maintaining the uterus in its normal position by any of the various pessaries that have been devised for the purpose, or by plugs of cotton-wool soaked in glycerin packed into the vagina so as to retain the uterus in its proper place. In the choice of a pessary, the practitioner must be guided by the success he has obtained with any one or more forms; but those that will be found to be of most service are Hodge's, Hodge's modified by an increase of the bend in both limbs, as usually practiced by the author, and which is also recommended by Dr. Albert Smith, of Philadelphia; or the elastic pessary of Dr. Protheroe Smith, which consists of, as it were, a double Hodge, joined in front so as to give two loops having a tendency to separate posteriorly; both loops are passed behind the retroverted fundus, and the anterior loop tending to rise, or separate itself from the posterior, exerts a gentle ever-lifting force on the fundus, and in many cases is efficacious in the restoration of the retroverted uterus.

In many obstinate cases it is necessary to fix the support externally either in front over the pubes, as in Simpson's intrauterine stem, or with Cutter's pessary, which is fixed behind, a band passing upwards in the natal cleft and secured to a belt. It would be foreign to a short practical treatise as the present to give a history and illustrations of all the various pessaries that have been suggested for the cure of retroversion of the uterus; such an attempt would need a volume for its elucidation. Let it suffice here to indicate the methods that are most easily practicable. There is one method, however, of treating cases of retroversion, retroflexion, and prolapsus of the uterus, that has hitherto received but scant attention at the hands of the profession; I refer to the postural treatment. By this is meant not the posture of the body merely, but the rectifying of the abnormal angle of the pelvis, which is present in most of the cases of the malpositions above-named. The instrument by which this method of cure is carried out is the pelvic band of Dr. Protheroe Smith. By it the pelvis, which in these cases is found too horizontal through a more or less obliteration of the lumbo-sacral curve, rendered evident by the advance of the trochanteric axes, prominence of the abdomen, and consequent enlargement of the flexor muscles of the thigh, is gradually tilted backwards until its normal angle is attained, when the pressure of the superincumbent viscera being taken off, the uterus is able to be restored and maintained in its proper position. In many cases this postural treatment of the pelvis is sufficient alone to effect a cure. The instrument is light, easily worn, does not show through the dress, improves the figure, and gives such support that patients are loath to leave it off.—HEYWOOD SMITH.

UTERUS, Rupture of—*Definition.*—A tear through the substance of the uterus, either through the body or neck.

Causes.—Degeneration of the contracile tissue; severe labor with obstruction; injury with instruments or in the operation of turning.

Symptoms.—A sudden severe pain causing the woman to cry out; sublence of labor pains; alteration of the shape of the abdominal tumor, from the child or part of it passing through the rent; hæmorrhage; collapse with cold prespiration.

Signs.—Small rapid pulse; recession of the presenting part; child's head or some other part felt too easily through the abdominal parietes.

Diagnosis —From symptoms and signs as above.

Prognosis.—Unfavorable.

Treatment.—Immediate gastrotomy in order to save the child, with all the precautions as in ordinary Cæsarian section. To attempt to deliver *per vias naturales* is too hazardous, and is waste of time.—HEYWOOD SMITH.

UTERINE ULCER.—FOLLICULAR.—*Definition.* — Acne, herpes or aphthæ of uterus.

Causes.—Similar to those of granular inflammation, endocervicitis, or areolar hyperplasia.

Symptoms.—As of granular inflammation.

Signs.—The cervix is felt to be studded with (1) small defined elevations, or (2) these may have ruptured and small ulcers occupy their place, or (3) these may have succeeded red hæmorrhagic tubercles.

Treatment;—(1) Puncture of the small cysts to evacuate their contents (viscid), (2) cavities touched with solid nitrate of silver, or the pernitrate of mercury.

SYPHILITIC.—Very rare; treatment as of ordinary chancre.

RODENT.—*Definition.*—A deep true ulcer of the cervix uteri; ultimately fatal, but not so rapidly as true cancer. *Causes.*—Unknown. *Symptoms.*—Pain not severe; emaciation slow; discharge sanious and subsequently offensive. *Signs.*—More or less deep, dark-red ulcer, with hard edges; uterus not fixed for some time, vagina not affected. *Diagnosis.*—From other forms of malignant disease by the slowness of its extension, by the mobility of the uterus, by the defined smooth edges, by absence of proliferating marginal growth. *Prognosis.*—Unfavorable. *Treatment.*—Destruction of surface of ulcer by potassa caustica or actual cautery, vaginal injections of tannin, iodine, or carbolic acid, rest, nourishing diet, subsequently opium, bromine.—HEYWOOD SMITH.

UVULA, Relaxed.—Usually part of a general condition of pharyngeal catarrh. Often causes troublesome cough. Astringent gargles. Touch with silver nitrate. Tonics. Stomachics. Attack cause, *e. g.*, over-indulgenc of any kind. Or seize the extremity with forceps and cut it off.

VACCINATION
VACCINIA } —*See Cow Pox.*

VAGINA, Abscess of.—*Definition.*—An abscess forming beneath the vaginal walls, or in the vulvo-vaginal glands.

Causes.—Pregnancy, dirt, vaginitis.

Symptoms.—Heat of vagina, pain, throbbing.

Signs.—A tumefaction, tender, red, hard, tense.

Diagnosis.—From cyst, by presence of signs of inflammation.

Prognosis.—Favorable.

Treatment.— Rest, hot fomentations, evacuation of pus.—HEYWOOD SMITH.

VAGINA, Cancer of.—*Definition.*—The type of cancer that affects the vagina is usually epithelioma; it arises either *de novo* from some portion usually near the orifice, beginning in some apparently warty growth, or it is propagated by contiguity from a vegetating or excavating cancer of the cervix uteri.

Causes.—Unknown; favored by hereditary tendency, gonorrhœa (?), dirt.

Symptoms.—Severe local pain, with watery and afterwards offensive discharge. Pain aggravated by coitus, which may produce bleeding.

Signs.—The growth is felt as a roughened elevation above the vaginal mucous membrane ; surface somewhat friable ; bleeds on being interfered with. In more advanced cases the disease may cause a swelling that obstructs the vaginal canal.

Diagnosis.—From warts by the history, the pain, and the illness that it produces.

Prognosis.—Unfavorable. The chief difficulty in eradicating epithelioma of the vagina lies in the fact that the mucous membrane is loosely applied to an extensive layer of connective tissue, whereby the disease is easily propagated to the neighboring parts and rapidly becomes too extensive to allow of beneficial treatment. For the same reason, if removed, it is extremely liable to recur.

Treatment.—If recent, the growth must be freely excised, and the wound thoroughly cauterized with the actual cautery. When the disease is extensive it should be removed as far as possible by gouges, and the actual cautery applied, or as much as possible of the vagina dissected out. Great care is needed afterwards by the frequent injection of carbolic acid to prevent septic absorption.—Heywood Smith.

VAGINA, Catarrh of—*Definition.*—A condition of the mucous membrane of the vagina characterized by the discharge of clear mucus, the result of relaxation of the capillaries of the mucous membrane, and consequent hyperæmia.

Causes.—Excessive coitus, cold, foreign bodies in the vagina.

Symptoms.—Some heat about the vagina, with sense of weakness ; absence of symptoms of further complications.

Signs.—Profuse glairy leucorrhœa devoid of pus.

Diagnosis.—From the discharge of endocervicitis by examination of the cervix.

Prognosis.—Favorable.

Treatment.—Injections of alum, carbolic acid, sulphocarbolate of zinc, tannin, etc.—Heywood Smith.

VAGINA, Cicatrix of.—*Definition.*—A tough band passing across the vagina or from the cervix uteri to the vaginal wall, or in some cases so extensive as almost or entirely to close the vagina.

Causes.—Parturition, inflammation from prolonged pressure of the child's head, unskilful use of instruments, pessaries, other injuries to the vagina.

Symptoms.—If slight, scarcely any; or the bands may drag on the cervix, producing misplacement; or there may be an impediment to coitus.

Signs.—The cicatrix is felt as a hard, unyielding band.

Diagnosis.—Easy, as not likely to be mistaken for any other morbid condition.

Prognosis.—If slight, favorable.

Treatment.—If it does not produce any important symptoms, a cicatrix is best left alone, for no cicatrix of the vagina can be divided without risk of cellulitis. If an operation is necessary, the division should be carefully performed, the vagina frequently syringed out with disinfecting fluid, and a vaginal dilator worn at intervals for some weeks.—Heywood Smith.

VAGINA, Cyst of.—*Definition.*—A movable tense swelling of the vaginal wall, rarely hydatids.

Causes.—Unknown.

Symptoms.—None save inconvenience from its projection into the vaginal canal.

Signs.—From abscess by absence of heat and redness, by its mobility, and by its translucent shining appearance.

Diagnosis.—As above.

Prognosis.—Favorable.

Treatment.—Aspiration, cutting a piece out of the cyst wall, or by carefully dissecting out the cyst.—HEYWOOD SMITH.

VAGINAL FISTULÆ.—(1) Vesico-vaginal, (2) urethro-vaginal, (3) recto-vaginal.

Causes.—Laceration or sloughing, the result of difficult labor, or, more rarely, of accident. Syphilis. (Fistulæ from cancer are so irremediable as to be best not considered here).

Symptoms.—Incontinence of urine or of fæces. But the latter may not occur unless the rent is very large or the fæces fluid. Flatus may escape and little or no fæces. Seat and extent of fistula must always be determined by combined digital and specular examination. Catheter often useful.

Treatment.—Purely operative. Cautery may be tried in very trivial cases.

Instruments.—Duck-bill speculum, long straight and long angular knives, long forceps, tubular needles, with Startin's handle, wire-twister, long curved scissors, long soft india-rubber catheter, silver wire, silk, handled sponges, etc. Chief points of operation are 10: (1) Health good, (2) rectum empty, (3) Position—lithotomy, (4) nates held widely apart by assistant, (5) duck-bill speculum. Operator will occasionally hold this himself, but usually hand it to an assistant. (6) Drag the fistula toward the vaginal orifice. This may be done in various ways, *e. g.*, with a blunt hook, or by one of the sutures. (7) Thoroughly pare the edges on the vaginal side, (8) but do not meddle with the vesical mucous membrane, (9) sutures must not enter bladder, nor be pulled too tight. (10) Sutures should enter and leave about half an inch from edges of wound. As soon as operation is done, place, secure, and leave flexible catheter in bladder. This should be cleaned twice daily. Patient now lies on her side. Unless untoward symptoms arise, leave sutures in ten days.

Operation for recto-vaginal fistula is precisely similar. Keep bowels confined for ten days. "Whether or not the sphincter ani should be divided will depend upon the degree of tension which is present when the parts are brought together. It is not a slight measure, and should not be heedlessly resorted to" (Hutchinson in Holmes's *System*). Wash out vagina daily with a syphon. In operations about the vagina, remember the erectile tissue which lies immediately beneath the mucous membrane, and therefore, remove the latter with delicacy, to avoid hæmorrhage. Such hæmorrhage I have seen instantly controlled by hot-water injections (Temp. 120°–130° Fahr.)

Vagina, Foreign Bodies in, generally pessaries or sponges, may cause a false diagnosis of metritis, leucorrhœa, or even cancer, patient forgetting their presence. Sometimes they have to be removed piecemeal. Pessaries have for years remained unsuspected in the vagina, causing foul discharges, etc.—C. B. KEETLEY.

VAGINA, Inflammation of—*Definition.*—Simple inflammation of the mucous membrane of the vagina. Vaginitis.

Causes.—Cold, excessive coitus, pessaries, fetid discharges, caustics, pregnancy.

Symptoms.—Heat in vagina; aching pain in perineum; frequent micturition; leucorrhœa puriform; soreness of vulva and thighs.

Signs.—Labia minora swollen and red; vagina red, and covered with purulent secretion; dyspareunia; occasionally the inflammation extends to the Nabothian glands and produces thick discharge from them. There is a follicular variety where the vagina is studded with thick granulations, usually associated with pregnancy. Vaginitis may lead to other inflammations by convection.

Diagnosis.—From gonorrhœa difficult, and sometimes impossible. (See Gonorrhœa.)

Prognosis.—If acute, cure in about two weeks; if chronic, indefinite.

Treatment.—Perfect rest, opium suppositories, injection of warm water with starch and infusion of poppy-heads; injections of sulphate of zinc, sulphocarbonate of 'zinc, alum, tannin; the application of a solution of nitrate of silver, 60 grs. to ℥ j; alkaline medicines.—Heywood Smith.

VAGINA, Lacerations of.—Usually the result of parturition, occasionally caused by broken chamber utensils, or by assaults, etc.; in rare instances, even by bridal intercourse. *Treatment.*—Trivial cases require only rest, silver nitrate, etc.; medium cases require sutures, and, if neglected at first, eventually operation for recto or vesico-vaginal fistula. Severe cases may cause collapse and rapid death. Complete circular rupture of vagina, with expulsion of uterus, has been known during parturition. And this, also, without violent instrumental interference.—C. B. Keetley.

VAGINA, Polypus of the.—*Definition.*—Rare. A small tumor which may be fibrous or of connective tissue, sessile or pediculated, from the vaginal wall.

Causes.—Unknown ; probably irritation.

Symptoms.—Sometimes dull, aching pain, and inconvenience from obstruction.

Signs.—The tumor is felt movable in the vaginal wall, and of a denser consistency than a cyst.

Diagnosis.—As above.

Prognosis.—Favorable.

Treatment.—Removal by dissection or the écraseur.—Heywood Smith.

VAGINA, Rupture of.—*Definition.*—A tear through the vaginal wall into the cavity of the peritoneum. It usually takes place at one side or the other of the cervix uteri, near its junction with the vagina.

Causes.—Spontaneous through a severe pain after considerable presssure of the head, or owing to the act of turning, or through unskillful use of instruments.

Symptoms.—Severe pain, collapse, hæmorrhage.

Signs.—The rent can be felt on examination, and not unfrequently the intestines protrude through the rupture.

Diagnosis.—On examination the finger can be passed through the rent and the intestines felt, and also the peritoneal surface of the uterus.

Prognosis.—Unfavorable.

Treatment.—Keep the patient for at least forty-eight hours on that side on which the rent is, so that the weight of the uterus may keep the sides of the wound in apposition ; full doses of opium.—Heywood Smith.

VAGINA, Stricture of the.—*Definition.*—A constriction by a cicatrix on one side, or as a circular band at any portion of the vaginal tract.

Causes.—Caustics, prolonged use of pessaries, injuries, parturition.

Symptoms.—Occasionally sterility, shortening of vagina.

Signs.—Examination may reveal a small opening which may at first be mistaken for a patent os uteri, through which if the finger is pressed the cervix uteri is discovered above the striciure.

Diagnosis.—As above.

Prognosis.—Guarded as to cure.

Treatment.—Slight incision and forcible rupture; the patient afterwards to wear for several hours daily a bougie, or one of Sims' vaginal dilators.—Heywood Smith.

VAGINISMUS.—*Definition.*—Hyperæsthesia at the site of the hymen, producing spasmodic contraction of sphincter vaginæ, and hindering coitus.

Causes.—Hysteria, excoriations, vascular growth of the meatus, vaginitis, fissure of the anus, hyperæsthesia of the remains of the hymen, too large size of the penis.

Symptoms.—Severe pain at attempts at coitus, consequent sterility, pain on walking or touching the part.

Signs.—Examination produces severe pain and spasmodic contraction of the sphineter vaginæ. Even the introduction of a small probe will produce pain.

Diagnosis.—Distinguish between hysteria and local mischief.

Treatment.—If hysterical, general treatment, tonics, exercise, injections of lead and opium, or pessaries of belladonna, and the occasional use of the vaginal dilator, gradually increased in size; physiological rest. If the disease is due to constriction at the site of the hymen, forcible dilatation with finger, and afterwards the use of the dilator. If the disease is due to hyperæsthesia of the torn edge of the hymen, the whole remaining edge of the hymen should be dissected off with a pair of curved scissors; the vagina is then put on the stretch, and incisions are to be made right and left on each side of the median line near the posterior fourchette; the glass dilator is then to be introduced and worn for two or three hours morning and evening. It should be retained *in situ* by a T-bandage and worn for several weeks. Pregnancy is the best cure.—HEYWOOD SMITH.

VARICELLA.—*See Chicken Pox.*

VARICOCELE.—Sometimes no less than seven causes of varicocele are given. And all these exist in every healthy individual, old or young, yet varicocele is almost unknown in young children and old people. Quite sufficient causes are to be found in the lax nature of the scrotum, and in the amount of violent congestion to which the spermatic veins are subject in many young adults. The left side is oftenest affected. Several reasons have been given, *e.g.*, rectangular junction of left spermatic vein with renal, and relation of former vein to sigmoid flexure of colon. Neither of these reasons will bear strict criticism. The left side of the scrotum is almost always larger than the right, and therefore laxer, as the left testicle is no larger than the right. The veins are enlarged, lengthened and thickened. The enlarged veins coil around the cord and against the testicle in such a way as to feel like a "bag of worms." Increase on standing. Decrease on lying down. Impulse (slight) on coughing. Often aching pain and tenderness. Depression of spirits. *Treatment.*—I beg to recommend the suspensory bandage which I have myself contrived. If properly fitted it removes the venous congestion as soon as applied, and will often substitute for low spirits and aching pain a feeling of brightness and of being well braced up. Other local apparatus are Wormald's ring, the common suspensory bandage (generally inefficient), Morgan's (of Dublin) suspender, an inguinal truss (which is said to sustain the column of blood above, though it must manifestly must equally obstruct the flow of blood from below.) Cold douching. Attention to the digestive system and bowels. Correction of evil habits. Operations for varicocele are not unpopular with some, who, by good luck, have had no shocking accident from embolism. Operation is justified when a patient finds it urgently desirable to pass into the public service without delay, or when a varicocle causes severe symptoms and will not yield to milder measures. Atrophy of the testicle said to be caused by varicocele. Many of the effects attributed to varicocle in in certain cases are quite as much due to genital irritation, of which the varicocele is itself a result. *Operations.*—Two kinds and many varieties. Both subcutaneous, in one the veins are merely constricted, in the other *they are constricted* at two points, and divided intermediately. The vas deferens (easily recognized by its cord-like feel), must be slipped well out of the way ; the spermatic artery lies close to it. Lee's operation is probably as good as any. In it, the veins are constricted in two places by needles beneath them, and figure-of-8 ligatures over them. As these ligatures are not subcutaneous, they must not be tight. A tenotomy knife divides the veins intermediately. On the 6th day, remove needles Bed for three weeks; then suspensory bandage.—C. B. Keetley.

VARICOSE ANEURISM—*See Aneurism Arterio-Venous*

VARICOSE VEINS—*See Veins.*

VARIOLA—*See Small Pox.*

VARIX.—Dilatation of veins.

Causes.—Mechanical obstruction (*e. g.*, varix of saphena from pressure of pregnant womb on external iliac vein). Occupations in which there is much standing, *e. g.*, those of laundress and shop-woman. Such influences as the above act chiefly on persons with an individual or a family predisposition, and on certain localities, namely saphenous and spermatic veins, and their radicles. It is said that the deep veins of the legs are nearly as often affected as the superficial. Frequently the minute cutaneous venous radicles are alone affected. This often occurs in the face, and is frequently hereditary.

Pathology.—Hypertrophy as well as dilatation of the venous coats, of the muscular as well as the fibrous elements. Dilatation sometimes regular, sometimes saccular. Extent varies from a small part of one vein to nearly all the veins of one or both lower extremities. As the valves do not grow proportionately, they soon become insufficient. Thickening of connective tissue round the veins. This may increase to general thickening of whole limb. Œdema from difficulty of circulation through the dilated veins with inefficient valves. Œdema leads to eczema, eczema to "varicose" ulceration. Occasional bursting hæmorrhage. This may lead to ulceration. Coagulation in certain parts of the vein, generally near valves, "phlebolites."

Symptoms.—No person who has seen one varicose vein can fail to recognize another; but when such a vein is surrounded by brawny tissue it may escape the sight; it then can be felt as a soft, subcutaneous "channel." Color varies from flesh-color to purple; usually bluish-gray. Aching pain after long standing. Varix of spermatic vein may cause neuralgia and mental depression. See Varicocele, above. Varicose veins, when inflamed, become hot, tender, &c.

Prognosis.—Easy to alleviate. Almost impossible to cure without operation, which is rarely justifiable (or entirely effectual when disease is extensive).

Treatment.—Support by pressure of (1) elastic bandages, (2) elastic stockings, (3) common bandages, preferably starched, (4) strong lace-up stockings. Avoid standing or long-sitting with legs pendent. Regular but moderate walking with legs well bandaged. Attend to bowels and general health. Iron. Horizontal rest in middle of day for an hour or two. Bathing in cold water after exercise. Elastic stocking should fit well, and are somewhat expensive, since they do not wear so long as bandages.

Operations.—A proceeding similar to one or other of these described above under head of varicocele, is applied to as many parts of a varicose vein as may be required to obliterate it, *e. g.*, the vein may be compressed in several places between needles passed beneath it and strips of India-rubber stretched over it (outside tbe skin), and subcutaneously divided between the points of acupressure (Lee). Caustics and injection of a drop or two of perchloride of iron have been used and recommended, the latter as an adjunct to acupressure (Bryant). Operation of excision of varicose vein and antiseptic precautions (spray, &c.), is much practiced at Guy's Hospital by Hawse and others. It is neatly described by Dunn in St. Bart.'s Hosp. Rep., 1879. —C. B. KEETLEY.

VEINS, Inflammation of.—A subject which in most surgical works is considered as if inseparable from Thrombosis. The separation is really difficult; but the mixture generally plunges the cautious student into doubt and confusion as to what he is really reading about. Let it be premised that (1) inflammation of a vein is apt to lead to thrombosis in it, but does not necessarily do so; (2) that it is sometimes impossible to diagnose whether a given case is phlebitis with or phlebitis without thrombosis; (3) that thrombosis is almost sure, unless quickly resolved, to lead to changes in the vein obstructed; (4) that many cases called phlebitis are really cases of periphlebitis, *i. e.*, of inflammation of the cellular tissue around the vein; (5) that the concurrence of thrombosis is generally the most serious part of a case of phlebitis. Hence in treating any case of phlebitis or periphlebitis, the idea of thrombosis and of its possible consequences—*e.g.*, solid œdema and pyæmia—never leaves the surgeon's mind.

PHLEBITIS.—*Causes.*—Injury, *e. g.*, phlebitis of saphena following a dog-bite, thrombosis or embolism, gout, obscure influences, possibly presence of irritating materials in the blood. Varicose veins particularly liable. Paget, classifying phlebitis according to its causes, give 8 kinds, viz.: (1) from injury, (2) from exhaustion, (3) from propinquity of inflamed or otherwise diseased parts, (4) rheumatic, (5) pyæmial, (6) puerperal, (7) gouty, (8) from poisoning by foul drains. Some of these causes are qualified in the original lecture. See Paget's Clinical Lectures. *Symptoms.*—Redness, hard swelling, tenderness, more or less pain in the course of a vein or of part of a vein. Swelling sometimes knotty, knot said to correspond to seat of valves. Œdema in parts whence the vein should drain blood. Sometimes visible enlargement of collateral veins. If suppuration occurs, there is local softening and general rise of temperature. Perhaps a rigor. *Diagnosis* has chiefly to be made from lymphangitis. It depends on the situation of the redness, &c., and on the width of the band of inflammation (greater in phlebitis). Glands also more likely to be enlarged in lymphangitis. *Pathology.*—Inflammation of the vein itself is almost always preceded by thrombosis; and, when not preceded by thrombosis, it is probably secondary to periphlebitis. The experiments of modern pathologists, *e. g.*, Lee and Callender,certainly prove that the older pathologists were accustomed to mistake mere thrombosis for an exudation of lymph from the wall of the vessel, but, to my mind, considering the anatomy of the veins, and arguing analogically, they are not numerous and severe enough to prove that exudation of lymph never takes place; and they most assuredly do not justify the dismissal of true phlebitis from our nosology. But any thickening of the outer or of the middle coats, or roughness of the inner coat of an inflamed vein, is so rarely found, independently of thrombosis, and is, in itself, of such small importance, that the most interesting pathological features associated with phlebitis must be sought for under the head of venous thrombosis. *Prognosis.*—*Vide* Venous Thrombosis. *Treatment.*—Rest. Elevation, gentle and even pressure. If a common roller be used, place a layer of cotton-wool beneath for the sake of elasticity. Regulate bowels. Moderate or low diet. If abscess threatens, it may be poulticed, fomented with hot water, and opened early. Extensive cases of solid œdema from venous obstruction are rarely entirely cured, some thickening remaining. As ammonia readily enters the blood, and, when there, retards coagulation, there is a rational indication for giving it in cases of phlebitis. I believe Dr. Richardson has demonstrated its value in cases of thrombosis. The carbonate in large doses would be the best form to administer.

Concerning gouty phlebitis, Paget says it is "either associated with ordinary gouty inflammation of the foot or joints, or occurs, with little or no evident provocation, in persons of marked gouty constitution or with gouty inheritance. Not rarely it has peculiar marks, especially in its symmetry, apparent metastases, and frequent recurrences." *Treatment.*—Employ some means as in managing gout affecting other external parts, especially rest and elevation. When vein affected is large, rest should continue a month from date of last marked attack of pain, to lessen risk of embolism.

VENOUS THROMBOSIS.—Formation of a clot in a living vein. *Causes.*—(1) Injury to a vein, *e. g.*, a wound. This may act either by causing a roughness or projection into the calibre of the vein, or by obstructing the flow of blood altogether. (2) Constriction. This is probably the way in which inflammation external to the vein usually acts: the immediate effect is to slow the blood-current. (3) Dilatation, by retarding the flow of blood, will produce thrombosis, *e. g.*, occasionally in varicose veins. (4) Another cause analogous in mode of action to the last two is constitutional debility, "marasmic thrombosis." (5) The entrance of an irritant or of septic poison into the blood. (6) Thrombosis in one vein may be merely the result of extension into it of a clot from a neighboring vein, *e. g.*, in certain cases of "white-leg," obstruction of external iliac has spread up from uterine veins through internal iliac. (7) Gout. *Patholagy.*—When first formed, clot usually small, rarely large. Increases by laminar deposits. Usually fills the vein; rarely leaves a channel beside it, *i. e.*, between it and the wall of the vein. Sometimes spinal in shape. Soon adheres to vein wall. (In all above respects, it contrasts with post-mortem clots). In time, come (1) changes in the clot, (2) changes in the vein itself, (3) changes in the peri-venous tissues. To these may be added (4) changes in the parts formerly drained by the vein. The clot may either (1) disintegrate and pass into the circulation, or (2) organize into a fibrous band united with the vein, or (3) that part of it first formed may melt into a puriform fluid—differing from true pus in containing granular debris and not corpuscles. In this case the portion of clot last formed almost invariably remains to shut off the liquefied part from the circulation, or (4) the white corpuscles which wander into the clot, may, instead of converting it into a fibrous mass as in case (2), be the agents in forming true pus within the vein, or (5) a portion or the whole of the thrombus may be washed away, thus becoming an embolus. When suppuration occurs in the course of a thrombosis it must be understood that the pus is usually in the first instance outside the vein. The course taken by the vein and its contained thrombus is almost always identical with the changes taking place in the cellular tissue around the vein. *Diagnosis.*—See Vein, Inflammation of. But thrombosis may be recognized by the hard, cord-like feel of the vein affected, before inflammatory change has commenced, and by the œdema. *Prognosis.*—Varies most widely according to the extent and position of the clot, according to the first cause (*e. g.*, whether the mere ligature of a vein, or the entrance of putrid fluid into it), and according to the course the case takes while under observation. The danger of embolism exists to a slight extent in almost every case, and of pyæmia in such as show a tendency to local suppurations or as arise in the course of wounds. *Treatment.*—See Veins, Inflammation of.—C. B. KEETLEY.

VEIN, Varicose—*See Varix.*

VENESECTION—*See Bleeding.*

VERRUCA Wart—*See Papillomata, under Tumors.*

VERRUCA NECROGENICA.— Definition.— A disease occurring among those who are engaged as butchers or in making post-mortem examinations, and consisting of warts produced by infection from dead animal matter.

Symptoms.—The warts consist simply of patches of morbid growths, having somewhat the appearance of epithelial cancer.

Diagnosis.—The occupation of the patient readily enables the character of these growths to be recognized.

Prognosis.—They have a tendency to recur, but are otherwise innocent.

Treatment.—Removal by the knife or by caustics.

VESICAL CALCULUS—*See Calculus.*

VICARIOUS MENSTRUATION.—*Definition.*—In cases where spammenorrhœa or amenorrhœa exists, hæmorrhage from some other source, as epistaxis, hæmoptysis, dysentery, bloody sweat.

Causes.—Congenital or other conditions of the ovaries or uterus hindering the normal flow; hæmorragic diathesis(?).

Symptoms and Signs.—Hæmorrhage as indicated above, occurring only periodically with the catamenial nisus.

Diagnosis.—Care must be taken in each case to exclude the existence of any other disease that might in its natural course give rise to the special manifestation of the hæmorrhage, as general plethora, phthisis, ulcer or cancer of the rectum.

Prognosis.—Favorable, if the uterus is amenable to treatment.

Treatment.—Anticipate the hæmorrhage by venesection, leeches to the uterus dilatation of the cervix and the introduction of a galvanic stem, exercise, counter irritation over the ovaries.—HEYWOOD SMITH.

VISION, Impaired—*See Refraction.*

VITILIGO is a term used by many at the present day as synonymous with leucoderma, but Dr. Tilbury Fox has seen such a disease as Bateman describes under this term, and believes it to be an atrophous condition in scattered spots, of very rare occurrence, and differing from what Willan intended by, and figured in, his plate 60 under that name. Willan's plate probably represents the disease named Xanthelasmoidea, by Dr. Tilbury Fox (*see* Clin. Soc. Trans.), and subsequently urticaria pigmentosa by others. (*See* Xanthelasmoidea.)—*Epitome of Skin Diseases*, FOX.

VITILIGOIDEA—*See Xanthoma.*

VOMITING.—*Etiology.*—The act of vomiting is excited either through some reflex irritation, or by a direct disturbance of the brain, affecting the stomach through the vagus nerves. Its numerous causes may be classed thus: 1. Those immediately acting upon the stomach, viz., irritating materials in its interior, whether introduced from without or formed there; organic diseases of its coats; obstruction at the pyloric orifice; external pressure upon the organ, or its displaçement, *e. g.*, hernia of the stomach through the diaphragm. 2. Reflex irritation from other sources, particularly the throat, intestines (hernia, worms), peritoneum, female genital organs (especially in connection with pregnancy), and testicles. Reflex vomiting also accompanies the passage of a gallstone or renal calculus, as well as other complaints attended with severe pain. It may arise in susceptible persons from any unpleasant smell, taste, or sight, or even from a sudden light. The vomiting which follows severe fits of coughing, especially in phthisis, comes mainly under this head. 3. Centric or cerebral vomiting. The chief causes coming within this group are injury to or disease of the brain or its membranes, especially meningitis, cerebral anæmia or congestion, a poisoned state of the blood, the poison being either introduced from without (*e. g.*, alcohol and its products, tobacco, tartar-emetic, chloroform, opium and its constituents, lobelia), or being generated within the body, as in various febrile disorders, especially at the outset, uræmia, or from the inhalation of a hot and tainted atmosphere, mere nervous shock or fright, hysteria and other so-called functional nervous derangements, the vomiting being then probably the result of disordered circulation and the imagination of unpleasant things. With regard to sea-sickness and other allied forms of vomiting, such as that brought on by swinging, these certainly come mainly within the cerebral class, but several theories have been proposed to explain the occurrence of this symptom under these circumstances. The peculiar movements, the appearance of objects in motion, and the unpleasant odors and sights usually present, probably all aid in inducing sea-sickness, though some authorities regard it as entirely due to a peculiar disturbance of the cerebral circulation. Vomiting is a prominent symptom in migraine or sick headache. Morning sickness is often associated with chronic alcoholism, being partly the result of the presence of deleterious materials in the blood, partly of catarrh of the throat and stomach, the former giving rise to fits of cough. It must not be forgotten that malingerers can sometimes excite vomiting at will.

Clinical Characters.—It is frequently requisite to make a thorough investigation with regard to vomiting in order to arrive at a correct diagnosis as to its cause, the following particulars being noted: 1. The times and frequency of its occurrence. 2. The circumstances under which it takes place, whether spontaneously only when the stomach is empty, after any food or drink, or only after certain articles or meals, it being important also to ascertain the quantity necessary to induce vomiting, and how soon it follows the introduction of the exciting materials in connection with some obvious reflex or centric cause, such as cough, irritation in the throat, severe pain, a bad smell or taste, smoking, drinking, or mental disturbance in certain position or on change of posture. It must not be forgotten that many poisons excite vomiting, and suspicious cases might come under observation needing complete and cautious investigation as to substances which had been taken into the stomach, or some of these might even be required for chemical examination. 3, The sensations preceeding and accompanying the act, especially noting if there is any feeling of nausea, as well as its degree, giddiness, prostration, or pain. 4. The manner in which the act is performed, this being determined by personal inspection if possible, especially remarking if it appears to be originated voluntarily, and whether it is performed easily, or with more or less straining and retching. 5. The after-effects, particularly as regards the relief of gastric pain or its intensification, and the influence upon cerebral symptoms. It may be mentioned here that the mere violence of vomiting may occasion serious lesions, such as rupture of the stomach or a vessel, apoplexy, or herina, and it often leaves a sense of soreness over the abdomen. 6. Examination of the vomited matters. This is of the utmost importance, and ought never to be neglected, and the same remarks applies to materials discharged by regurgitation or eructation, or brought up by the stomach-pump. The chief points to be noticed are: *a.* The quantity rejected. *b.* The taste, as perceived by the patient. *c.* Odor. *d.* General physical characters as to color, and as to the materials of which the vomited matter consists, whether of different kinds of food, unaltered or in various stages of digestion, decomposition, or fermentation; unusual substances introduced from without; blood or altered blood; gastric juice; watery fluid; mucus; biliary matters; fæces; morbid products, such as calculi, worms, hydatids, portions of growths, or pus. It is also desirable to observe whether the vomit is frothy or yeasty-looking. *e.* Chemical characters. The reaction should always be taken; and in certain cases it may be desirable to make a chemical analysis, in order to determine the presence of products of fermentation, gases; bile, sugar, urinary compounds, or inorganic or organic poisons. Of course in any case of suspected poisoning a complete analysis must be performed. *f.* Microscopic characters. The chief microscopic elements to be looked for in vomited matters are blood-corpusclcs, pus-cells, cancer-cells, echinococci, and sarcinæ or troulæ. The microscope is also of use in detecting certain poisonous substances. Sarcinœ are vegetable growths, and appear as little oblong rectangular bodies, in shape resembling minute wool-packs, being divided into four equal parts by cross lines which correspond to dissepiments, these being again subdivided by fainter lines, so that in all they make up sixty-four divisions, each ultimate particle consisting of an elementary square cell. Sarcinæ are only found in acid vomit, which usually presents well-marked signs of having undergone fermentation, and they are most frequently observed in connection with pyloric obstruction.

Diagnosis.—By attention to the particulars just considered, aided by the history of the case, and the other symptoms present, the cause of vomiting can generally be satisfactorily made out. It is requisite, however, to point out the chief distinctions between cerebral and gastric vomiting. 1. Nausea usually precedes and attends the latter, but is often absent in the case of the former. 2. The accompanying symptoms in the one case point chiefly to the ailmentary canal. and especially to the stomach; in the other to the brain, head-symptoms being prominent. 3. The act of vomiting generally relieves any nausea, giddiness, or headache which may procede it when it is gastric in origin; such is not the case with cerebral vomiting.

Treatment.—Vomiting occurs under such a variety of circumstances that little more can be done here than to indicate the general principles upon which its treatment should be conducted. 1. The cause must be sought out and removed if possible. Thus an emetic is not uncommonly one of the best remedies in order to clear out the stomach of irritant matters. Any reflex excitement must also be subdued. Patients should be told to aid voluntarly in suppressing vomiting as much as they can, being also warned against bringing it on by coughing or any such act. 2. Attention to diet is all-important. By withdrawing food altogether, or only giving very small quantities of cool or iced liquids, especially milk with lime-water or soda-water, or brandy with weak beef tea or beef juice, sickness may often be effectually stopped. It is particulary necessary to inquire into the feeding of children, as vomiting in these subjects is so commonly due merely to errors in this respect, 3. It may be useful to attend to certain general matters, such as positions, rest, and free ventilation. Especially is this the case with regard to cerebral vomiting and sea-sickness, against which absolute rest in the horizontal posture, with a free supply of fresh air, may afford some protection. Pressure by means of a girdle across the abdomen has been recommended to prevent sea-sickness. 4. The chief direct remedies for the relief of vomiting are the sucking of small lumps of ice; effervescent draughts with hydrocoryanic acid, or the latter with mucilage; iced champagne, brandy with soda-water; opium, either in the form of pill, as the tincture, or liquor opii, along with other remedies, or in an enema with starch; morphia in pill, by hypodermic injection, or sprinkled on a blistered surface over the epigastrium; chloroform, creasote in drop doses in the form of pill; sulphurous acid, sulphite of soda or hyposulphites, should the vomiting depend on vegetable growths, or carbolic acid under the same circumstances; nux vomica or minute doses of strychnia, the last mentioned proving wonderfully efficacious in some instances, after all other remedies have failed. Bismuth, magnesia, and carbolate of soda are also valuable under csrtain conditions. Dr. Ringer recommends in many forms of vomiting drop doses of vinum ipecac, every hour or three times a day according to circumstances; in others he find arsenic useful. It is desirable to make all draughts as small and as agree ble to the taste as possible. 5. *External applications* over the epigastriu are sometimes beneficial, especially sinapisms, a small blister, cold by means of the ice-bag, and friction with chloroform or belladonna liniment.—FREDERICKS T. ROBERTS.

VULVA, Cancer of.—*Definition.*—Epithelioma affecting the vulva.

Causes.—Unknown. Predisposing heredity, irritation from discharges, dirt, or sequela of some irritating local malady.

Symptoms.—Sharp, stabbing pain, and heat in the parts.

Signs.—At first a red irritable sore, tending to be intractable to treatment; afterwards a coarse granular growth, secreting an irritable ichorous discharge, or an excavating ulcer of the part. with a hardish base.

Diagnosis.—From syphilis by the history and effect of treatment; from other ulcerations by the character of the pain, and its resisting healing remedies.

Treatment.—If seen in time, free excision; if too late, destruction by pernitrate of mercury, potassa caustica, or the actual cautery, and the application of carbolic acid and morphia pessaries.—HEYWOOD SMITH.

VULVA, Condylomata of.—*Definition.*—Warts on the labia majora and minora.

Causes.—Gonorrhœa, sequela of syphilis, or from irritation in a case where there is an hereditary syphilitic taint.

Symptoms.—Irritations about the parts, not necessarily painful.

Signs.—A profuse crop of warty growths studding the parts.

Diagnosis.—Not to be confounded with any other growth, but difficult to differentiate as to whether from gonorrhœa or syphilis.

Prognosis.—Often tedious to cure.

Treatment.—The application of pernitrate of mercury, nitric acid, strong carbolic acid, excision of all the growths with scissors, and the subsequent application of the actual cautery, or the application of a powder of equal parts of acetate of copper and savin.—HEYWOOD SMITH.

VULVA, Cyst of.—*Definition.*—A cyst in the labium majus.

Causes.—Accumulation of the fluid in one of the vulvo-vaginal glands.

Symptoms.—Swelling and fullness of the part, unaccompanied by much pain.

Signs.—A tense, hard swelling, not red.

Diagnosis.—From hernia by the touch: from abscess by the absence of inflammation.

Prognosis.—Favorable.

Treatment.—Excision of a piece of the cyst wall; incision and the keeping of the parts dressed until the wound granulates up; or by dissection out of the cyst.—HEYWOOD SMITH.

VULVA, Occlusion of.—*Definition.*—Absence of apparent orifice of vulva.

Causes.—Congenital, adhesion after injury.

Symptoms.—If in adult, retention of menses

Signs.—A skin is seen to close the orifice

Diagnosis.—As above.

Prognosis.—Favorable.

Treatment.—If in an infant, gentle separation of the labia will often tear open the vulva without bleeding. In the adult the skin is easily divided with the bistoury.—HEYWOOD SMITH.

VULVA, Œdema of.—*Definition.*—Anasarca in the connective tissue of the labium majus.

Causes.—Pressure from pregnancy or pelvic tumors.

Symptoms.—Inconvenience in locomotion and sitting.

Signs.—Semi-translucent swelling of the labium.

Diagnosis.—From abscess by absence of heat and pain ; from hernia by consistence of swelling.

Prognosis.—Favorable on removal of cause.

Treatment.—Delivery. If from pelvic tumor, the horizontal position, or with elevation of the feet of the bed.—HEYWOOD SMITH.

VULVA, Pruritus—*Definition.*—Irritation and itching of vulva.

Causes.—Irritating discharges, diabetes, warmth, high living, menstruation, pregnancy, dirt, eruptions, pediculi, acarus scabiei, masturbation.

Symptoms.—The intolerable itching leading to constant friction and often excoriation.

Signs.—Sometimes redness and dryness of parts ; sometimes no appearance of irritation.

Diagnosis.—As pruritus is only a symptom of some exciting cause, the cause must be diligently sought for. See Causes.

Prognosis.—Often intractable.

Treatment.—It is useless to treat merely the symptom. The cause being discovered, the treatment should be applied to its remedy. Occasionally soothing applications may be of service, as Goulard water and opium, lotions, with hydrocyanic acid or tobacco, or a powder composed of equal parts of oxide of zinc and chalk. Tonics, good food, fresh air, bathing, hot injections.—HEYWOOD SMITH.

VULVA, Ulcer of.—*Definition.*—Simple strumous ulcer of vulva, or gangrenous ulcer.

Causes.—Of the former, the strumous diathesis ; of the latter, epidemic puerperal mischief, scarlet fever, etc.

Symptoms.—Of the former, irritation, soreness, not much pain ; of the latter, severe cachexia, a fetid discharge.

Signs.—Of the former, a simple ulcer ; of the latter, a swollen, purplish state of the part ; then an ashy-gray patch, which soon ulcerates and spreads rapidly. Discharge ichorous and very fetid.

Diagnosis.—From symtoms and signs as above ; from cancer ; from syphilis.

Prognosis.—Of the simple form, favorable ; of gangrene of the vulva, unfavorable.

Treatment.—Of the strumous ulcer, stimulating applications, as nitrate of silver, "red" wash, tonics, fresh air, etc. ; of the gangrenous ulcer, stimulating food, alcohol, iron, and quinine ; to the ulcer a powerful caustic, the actual cautery or nitric acid, followed by charcoal poultices.—HEYWOOD SMITH.

VULVA, Varicose Veins of.—*Definition.*—A varicose condition of the labia majora and minora, extending at times into the vagina.

Causes.—Pregnancy, or pressure from some pelvic tumor.

Symptoms.—Pain and fulness of the part, and discomfort on sitting.

Signs.—Full, knotty, irregular swelling of the parts, with dark discoloration.

Diagnosis.—When examined, not to be confounded with any other morbid condition. If ruptured during parturition, it is often difficult at once to discover the source of the hæmorrhage ; but when the uterus is excluded as the source, the vulva and vagina should be carefully inspected in order to discover it.

Prognosis.—If unarrested, unfavorable.

Treatment.—Cold applications and pressure by a pad and T bandage. If ruptured, pressure, or the application of some styptic.—HEYWOOD Smith.

WARTS—*See Papillomata, under Tumors.*

WEED—*See Puerperal Ephemera*

WHITE LEG—*See Phlegmasia Dolens.*

WHITLOW.—Erysipelatous inflammation of finger. Varies in extent from trivial but painful blush beside nail, to diffuse suppuration spreading up fore-arm and destroying tendons, phalanges, and even wrist-joint.

Causes.—Local punctures, cuts and scratches, poisonous or otherwise. Predisposing causes are same as those of erysipelas, *quod vide*, *e. g.*, low state of health, diseased kidneys, epidemic and endemic influences.

Pathology.—A cellulitis, at first, usually, of cellular tissue around ungual phalanx, but tending to spread to sheaths of tendons, to skin and subcutaneous tissues of back of hand, and even, as above stated, to phalangeal, and in the worst cases to metacarpal and still larger joints. May subside. Usually suppurates. Local and general effects precisely similar to those of cellulitis elsewhere. If a phalangeal joint be affected, or a tendon slough, there will probably be a stiff or contracted finger afterwards.

Symptoms.—Local redness, heat, throbbing, pain, tenderness, and swelling. Feverishness in slight cases, prostration in severe ones. Increased swelling and œdema when pus has formed. As incision is generally made early, and the part is exquisitely tender, fluctuation need not necessarily be felt for.

Diagnosis.—Effects of a foreign body in the finger or hand may be mistaken for a simple whitlow.

Prognosis.—Usually good as regards life, even in extensive cases, extending up fore-arm. Bad or good locally according to extent to which tendons and joints are affected.

Treatment.—Rest, local and general. Elevation and flexion; carry hand in sling just beneath chin. Pressure on brachial artery; patient can be taught to make it with the thumb of his sound hand. Poultices; frequent hot fomentations. After forty-eight hours, if symptoms are unrelieved, make two longitudinal incisions; one on each side of palmar surface of finger (of course, excepting those slight cases where this part remains unaffected). Give a purgative, *e.g.*, calomel, gr. x., afterwards iron (tinct. ferri perchlor., m. xv. ter d. s.). Regulate diet according to patient's condition and constitution. As a rule, avoid meat. Appetite is generally bad. Phalanges may have to be excised or fingers amputated, in consequence of ill effects of old whitlow. During convalescence, if contraction threatens, place finger on a splint. Stiffness of hand may persist for a very long time, and be eventually removed by passive exercise, frictions, etc.—C. B. KEETLEY.

WHOOPING COUGH—*See Hooping Cough.*

WOUNDS.—*Classification.*—(1) Incised, (2) lacerated, (3) contused, (4) punctured, (5) poisoned. Wounds are also either open or "subcutaneous." 1. Simple incised.—Its characters are clean edges, freedom from bruise or laceration and from poisonous matters, at least when first inflicted. 2. Lacerated.—Its edges are usually irregular, and frequently more or less contused. Comparatively small tendency to bleed. 3. Contused—Has bruised edges; is usually also "lacerated." 4. Punctured.—*E. g.*, a bayonet stab, generally narrow and deep. When caused by gun-shot, its walls are bruised. 5. Poisoned wounds are such as snake-bites and dissection-wounds. In sub-cutaneous wounds the aperture in the skin is small compared to the incision beneath it, *e. g.*, in "tenotomy."

Pathology.—Process of repair, etc. (compare with inflammation, *quod vide*).—When a simple incised wound is inflicted, nature first checks hæmorrhage by closing the ends of the divided vessels in the manner described under hæmorrhage, *e. g.*, by coagulation and contraction. At the same time there is usually a thin clot formed between the two surfaces of the wound. In consequence of the blood being unable to find its way through the divided vessels, there is congestion of the vessels about the wound; and the congestion of the neighboring parts, caused by the blood pressing through the nearest uninjured channels, is called "collateral fluxion." In this way is produced the narrow line of redness around a fresh wound. The course of events after this is determined by whether the wound is to heal by the first intention (primary union), or by granulation.

First intention.—There is a great accumulation of white corpuscles, both inside and outside the blood vessels near the wound. These leucocytes permeate the clot, if there be one, cause its liquefaction and absorption, and take its place. At the same time, the edges of the wound are themselves to some extent dissolved and replaced in the same manner. The leucocytes pass gradually through an oval into a spindle shape. These spindle-cells form, partly of themselves and partly of the intercellular liquid substance in which they lie, fibres of connective tisue, thus tying the two sides of the wound together. At the same time, new capillaries are formed, which bridge across the wound, allow blood once more to flow in its old course, and thus relieve the collateral fluxion. At this stage the scar grows redder, and its surrounding edges paler. The new capillaries are developed in two ways: (1) by loops which grow out from the vessels divided by the wound; (2) by certain rows of spindle-cells which develop into capillaries. At a later stage, the new fibrous "cicatricial" tissue contracts, becomes "drier," *i. e.*, less succulent, and, in contracting, obliterates many of the new capillaries. The cicatrix becomes, therefore, smaller and paler. Of course, after healing by the first intention, it is merely linear at first; but in a short time it may defy detection altogether. So rapidly does this disappearance take place in some cases that pathologists have described what they call "immediate union" or "primary adhesion," meaning, presumably, a perfectly simple cohesion like that of one piece of melted sealing-wax with another, and without further interstitial changes.

Granulation.—The process of healing when raw surfaces cannot be brought into apposition, and unfortunately also in some cases where they can. The microscopic anatomy or this process differs from that of "primary union," in that (1) the accumulation of leucocytes forms, on the surfaces of the wound, small elevations called granulations; (2) much of the waste tissues and superfluous corpuscles, which would be absorbed or profitably used in healing by the first intention are, in the case of healing by granulation, cast off as pus; (3) the new capillaries cannot extend from one edge of the wound to the other, because they are too much separated either by distance or by some other obstruction, *e. g.*, a foreign body or excessive clot; (4) a much larger production of epidermis is required to cover the surface of the wound The resulting scar is larger, coarser, and much more prone to mischievous contraction. The new epidermis is developed from the most superficial layer of corpuscles in the granulations; but it appears concentrically from the epidermis at the edge of the wound, or else spreads from islets of old epidermis left by nature or placed by art on the area of the wound. (See Skin-Grafting.) Pus-corpuscles are identical with leucocytes, but often contain several nuclei, indicating a tendency to multiply by division. Connective tissue, epidermis, epithelium, bone, and even nerve are reproduced perfectly (the last only to a limited extent). Muscles are only repaired by development of connective tissue. Lacerated, and even contused wounds, usually fail to heal by the first intention. The latter, especially, are liable to slough at the edges, and both tend to suppurate freely. Much depends on the conditions of each case, *e. g.*, on situation of wound, on state of patient's viscera, and on treatment. Punctured wounds usually heal by first intention, except when also contused, as they are in gun-shot wounds. Five methods of healing have been recognized, viz: (1) primary adhesion; (2) first intention (or primary union);

(3) granulation (or second intention); (4) union of two opposed surfaces, each covered with granulations (third intention); (5) scabbing. Method 4 combines, in succession, the processes of 3 and 2; 5 is probably similar to 3; only, such waste-products as there are, dry up into a scab, being of very small amount.

Healing by Organization of Clot is exactly similar in nature to healing by the first intention, in which, indeed, a thin clot generally does exist and becomes organized. A curious phenomenon is that, if any clot project beyond the level of the general surface, the new epidermis cuts off the projecting part, healing only over the remainder. Organization of clot is beautifully seen after antiseptic osteotomy, and is well described by McEwen in his book on that subject. Lister rightly holds that the frequency of this process under antiseptic treatment is a strong proof of the soundness of his doctrines.

Consequences of a wound are (1) pain, (2) hæmorrhage, (3) displacement, (4) loss of function, (5) shock. Pain of dividing skin, tense fascia, and bone comparatively great. See hæmorrhage for separate notice. Wounds by laceration, crushing and cauterization usually cause little, often no hæmorrhage. Displacement is usually a consequence of retraction. Not only muscles, but mere fibrous structures retract, by virtue of their elastic constituents. Loss of function varies in extent from stiffness, the result of tenderness, up to death. See separate notice for shock. Retraction is greatest in the direction of the length of a limb, and in the muscles as compared with the skin, &c. Amount of pain varies with character, and even with occupation of patient. Of course, loss of function and displacement may amount to permanent paralysis and deformities. It is when the surgeon is about to inflict the wound (*i. e.*, operate) that he has most to consider the above-mentioned "consequences." In treating accidental wounds, the "consequences" are generally too manifest.

Prognosis depends on (1) locality, (2) extent, (3) health of patient, especially state of kidneys and lungs, (4) age, (5) habits, (6) surroundings, (7) character, *i.e.*, whether incised, or lacerated, or poisoned or otherwise, (8) treatment. There are also other conditions less generally active, *e.g.*, race, which also may be secondary to such influences as habits. That wiry countrymen are much more hopeful subjects than fat, babby townsmen, is an example of the action of habits and health. Wounds of the upper do better than wounds of the lower extremity, especially as age advances. Generally youth is a great advantage, but infants bear hæmorrhage badly. There is no more unfavorable habit than habitual drinking.

Treatment.—Indications are: (1) to check hæmorrhage, (2) to remove shock, if very severe, (3) to remove foreign bodies and to cleanse, (4) to adjust, (5) to dress, (6) splints, position, &c. 1 and 2 *vide* hæmorrhage and shock. 3. Use of hot water, cold water, sponges and camel's hair brushes, forceps, fingers, &c., according to peculiarities of each case. Gentleness is imperatively required. 4. In adjusting, avoid tension. Arrangement of joints, &c., so as to relax parts divided: *e.g.*, after accidental division of tendo Achillis, foot should be extended and leg flexed. 5. Dressings: prime objects are, firstly, to keep the divided parts in proper position; secondly, to prevent local and general complications which may interfere with healing, and even endanger life. First object is fulfilled by use of sutures, strapping, pads, splints and position; of course, all this array of means is not used in every case. Second object requires precautions to be taken against (1) exposure to draughts of cold air, (2) painful movements and positions, (3) septic influence. Changes of dressing should be quickly effected, and windows and doors closed during the process. Pain is prevented by careful adjustment of dressing, of splints, of position (especially by elevation and flexion), by use of swing-cradles, of cushions, &c. Opiates sometimes desirable, especially morphia subcutaneously. Septic influences: their avoidance can probably be thoroughly secured in only one way, viz., by preventing the access of living germs to the wound. But much good may be done by removing, as fast as they collect, all discharges which can form a nidus for these germs. The former end is most surely secured by the antiseptic system rigorously applied. The latter aim can be more or less successfully obtained by several means. Lister's antiseptic system, though indirectly (*e.g.*, by expediting cure) economical, is directly expensive, especially when the surgeon does not habitually employ it, and in the case of very large operation wounds, *e.g.*, amputations of the thigh. In these cases immense quantities of expensive dressings have to be changed, often daily, because of the great discharge. As, also, no antiseptic system can provide against all the dangers of wounds, it is not surprising that a surgeon, after losing a case or two, dressed with thorough antiseptic precautions, should be disposed to return to more familiar methods, upon which, in past times, his fortune may have smiled more favorably. In the case of moderate-sized wounds, Lister's antiseptic system is simply perfect, and almost proof against ordinary carelessness, ignorance and stupidity. On the other hand, "open treatment" and oakum dressings are free from the objections which may be urged against Lister's antiseptic system, in the case of great amputations. They are very cheap and simple. They doubtless both act by gaining the second end above mentioned, viz., the removal of discharge from the wound as fast as it forms, and, consequently, by depriving the septic germs of material to work upon. Pasteur's experiments prove germs to be too universal for the oakum dressings to act otherwise, as no precautions, such as the carbolic spray, are usually taken whilst changing them. Oakum dressings have these superiorities over open treatment, they protect the wound from cold draughts, they destroy offensive smells, keeping the general air of the ward pure, and they actively drain the wound by their power of capillary attraction. What I saw when house-surgeon under Gamgee, at Birmingham, convinced me that no system of wound dressing could be complete without some provision for gentle and elastic compression. This, Gamgee used to secure with cotton-wool: but as soon as Martin's bandages became known in England I took to completely covering with them most of my operation wounds which were dressed antiseptically, and some which were not. I have never seen a stump which healed more rapidly, or looked better when healed, than one which had no dressing whatever but a rubber bandage over it, and a pad of oakum to drain into. But in this particular instance it was not practicable to dress antiseptically. The mode of dressing used lately by Esmarch with a success perhaps unparalleled, not only as regards general results, but as regards individual cases, may be described as an instance of the successful combination of antisepticism with gentle compression. Next the wound are placed pads soaked in iodoform and absolute alcohol (ten per cent.), then an iodoformed bandage, then a large pillow of jute and gauze, then a moist bandage, and lastly an elastic bandage. Even after amputation of the thigh, this dressing seldom needs a single renewal. Healing takes place by the first intention, not even a hole for the drainage-tube being left; for Esmarch uses absorbable tubes of decalcified bone. It is most important before applying such dressings to check all oozing of blood. Recurrent hæmerrhage need scarcely be feared at all. The under bandages should be put on as lightly as possible, and the elastic bandage should be applied with great care and gentleness. Iodoform, insufflated, makes a capital dressing for many wounds, *e. g.*, lithotomy, perineal section, operations near the mouth, anus, urethra, and the like. Other modes of local treatment, comparatively rarely employed, are cotton-wool dressing, irrigation and immersion. Poultices of linseed, or of bread, are still in common use, and are certainly soft, moist, hot, and comfortable, and therefore possibly act favorably on any local inflammations that may be near the wound. Oakum (including the kinds termed "tenax," "stipium," etc.) is applied like a poultice. Like every other antiseptic substance, it is somewhat irritating; therefore a narrow strip of protective should be placed next the edges of the wound. The not uncommon practice of using lint soaked in carbolized oil as a protective is unreasonable; for the lint obstructs the absorptive power of the oakum, whilst the carbolic acid is as irritating as the tar in the oakum. Rarely should the wound, excepting when fresh, be syringed or washed—it cannot be kept too dry. *Vide* Antiseptic Treatment. Read Gamgee on the "Treatment of Wounds," an authority on oakum and cotton-wool dressings, but unjust to Lister and his methods. Without antiseptic treatment grand statistical results have been obtained by various surgeons; but considering how many things affect the success of surgical practice, *e. g.*, experience, observation, judgment, resource, manual dexterity, pluck, and, perhaps above all, patience and enthusiasm, not to mention endemic and epidemic influences, it is certain that mere statistics prove little for or against any system of dressing wounds, unless these statistics extend over long periods of time, different localities and immense numbers of cases. And, even then, they should not be permitted to overrule other evidence such as presents itself to the surgeon who, in London at all events, watches any small series of wounds in detail, of which some are treated antiseptically and others not. For even the statistics of an honest observer have not really the force of mathematical certainty. Behind them is always the human heart whose truth is often noble but never mathematical.

These remarks are not uncalled for. Repeatedly of late, have the student and practitioner been invited to deprive themselves and their patients of the safeguards offered by modern science, on the strength of a comparison between the statistics of two places only. Such a comparison no more furnishes an argument against Listerism than the security of those Acadian farmers who had "neither looks to their doors nor bars to their windows" condemns the use of the metropolitan police.

Drainage.—A necessity for all wounds where there is likelihood of suppuration or serous discharge. Effected by drainage tubes, of rubber, of decalcified bone (or, less frequently of twisted wire), by strands of cat-gut or horse-hair, or by strips of gutta-percha. Desirable to consider how to favor drainage in arranging direction of cuts and position of wound. A drainage tube is a foreign body, which may itself cause-pain and irritation. As a rule it should be greatly removed,squeezed and washed at every dressing. It is useless to try to squirt carbolic lotion through seven or eight inches of a drainage tube riddled with holes and lying in a wound. Before moving to clean tie a piece of silk to it. Leave this in the wound, to afterwards use as a guide for replacement. Be very gentle.

Very rarely do any severe wounds of the soft parts alone require *amputation.* But they may do so when (1) even recovery would only be with so much deformity or loss of function that the part would be worse than useless; or (2) when the injury is so extensive and serious that gangrene and death are threatened. Injuries complicated with division of large arteries, with much contusion, and in the lower extremities of adult, and, much more, of aged people, are of this nature. No verbal rules can do instead of experience in in deciding in such cases. Here even the master-surgeon steers with perplexity between Scylla and Charybdis.—C. B. KEETLEY.

WOUNDS, Poison, by Bites of Snakes, etc.—*See Poison Wounds by Snakes, etc.*

WRIST, Dislocation of—*See Dislocations.*

WRIST, Excision of—*See Excision of Joints.*

WRIST, Drop—*See Saturnism.*

WRITER'S CRAMP (Scrivener's Palsy)—*See Paralysis, Local.*

WRY NECK—*See Neck, Injuries of.*

XANTHELASMA—*See Xanthoma.*

XANTHELASMOIDEA is a term which we give to a rare form of eruption characterized by the presence of certain buff-colored patches that appear in a scattered form in young children, and at first sight look like xanthelasma, in small patches, so far as external features are concerned. Cases of the kind have been reported by us in our Atlas of Skin Diseases, and a plate representing the disease as it attacked the leg of a little boy is there given. The disease may be in part congenital, or it may appear soon after birth, usually when the babe is about two months old. Parents say that itchy bumps or places like flea-bites, or even vesicles, first appear, and these turn into red, bumpy places, which speedily assume a buff color. The spots may be scattered sparsely or thickly, over parts of the whole body. They are distinct the one from the other, and vary in size from a pea to a shilling or so. The diseose has been generally mistaken for syphilis. The spots are readily irritated, and " wheal-like " appearances are presented by the patches when freely rubbed ; wheals also are produced by scratching in the healthy islets of skin, and this fact, coupled with the presence of the pigmentation, has led to the suggestion of the term urticaria pigmentosa for the disease; but the wheal-like aspect is only accidental and temporary; a superaddition, in fact, to the real morbid condition, which is clearly an increase of substance in the skin, that undergoes no change through a long series of years. Nothing is known of the nature of the disease histologically, but we hope ere long to publish the results of our researches on this point. The disease seems to be unaffected by remedies, to produce no disturbance of the general health, to undergo little change except that the spots become less elevated and paler by age. The chief thing to recollect about it is its liability to be mistaken for congenital syphilis, an error that may entail considerable risk to the child from the adoption of an anti-syphilitic treatment for the disease.—*Epitome of Skin Diseases, Fox.*

XANTHOMA.—*Definition.*—Xanthoma consists in the formation of yellow or buff-colored, clearly defined patches in the skin, on a level with it or only slightly raised, and most frequently in association with prolonged jaundice.

Symptoms.—Xanthoma occurs in adults, and about twice as frequently in women as in men. It may be localized and limited to the eyelids only, where it usually begins, or patches may be found scattered all over the surface of the body, in the mucous membranes, and in the sheaths of tendons. Two forms are described :

1. Xanthoma planum.
2. Xanthoma tuberosum.

1. Xanthoma planum begins, usually symmetrically, near the inner canthus, and extends slowly along both lids, especially the upper one, spreading then over the adjacent part of the cheek where the skin is thin. The patches, of different sizes, and varying in color from yellowish-white to a faded buff or a chamois-leather tint, have sharply defined margins, a smooth surface level with the skin or raised into little tubercles at the edges. There is no difference in consistence or thickness between the affected and the healthy skin, and usually no subjective symptoms are present.

2. Xanthoma tuberosum occurs as isolated nodules, or plaques, made up of aggregations of little tubercles, varying in size from a millet seed to a

grain of wheat, just slightly raised above the level of the skin. They occur but rarely on the eyelids, more often on the cheeks and ears, hands and feet, and sometimes generally over the whole surface of the body. They can be pinched up with the skin, with which they are continuous, have a feeling of elasticity, and are attended with slight tenderness on pressure. On the palms and soles, however, they often cause severe pricking and burning pain, which interferes much with the use of the limb. Both forms of xanthoma not unfrequently occur in the same individual. The patches, growing slowly by extension or by the formation of new marginal spots, reach their full development, and remain unaltered for the rest of life, undergoing no degenerative changes and causing no impairment of the general health. They have been observed in various diseases, and even in healthy persons, but in a large number of cases—in 15 out of 30 enumerated by Kaposi—persistent jaundice has preceded or accompanied them. Whether, however, the jaundice—produced most frequently, according to Charcot, by hypertrophic cirrhosis—is the cause of the skin affection, or whether both phenomena are due to some other factor, is as yet unsettled.

Diagnosis.—Xanthoma may be mistaken for confluent masses of milium, especially on the eyelids. A superficial cut over the mass enables the milium granules to be easily squeezed out, whereas xanthoma, being imbedded in and continuous with the healthy corium, cannot thus be enucleated.

Prognosis.—Xanthoma is in no way dangerous to life, exerts no influence on the general health, and is annoying only from its unsightliness and from the pain when on the palms or soles.

Treatment.—The excision of the whole nodule down to the suhcutaneous tissue, in such a place that the scar will not subsequently cause interference with the functions of the part, is the only remedy.—MALCOM MORRIS.

XERODERMA—*See Ichthyosis.*

XEROPHTHALMIA }
XEROSIS } *See Conjunctiva, Diseases of.*

YAWS.—*Definition.*—A contagious disease of the West Indies and Africa, rarely seen in this country, characterized by the appearance of a pustular eruption, which is replaced by a series of ulcers and attended by considerable constitutional disturbance.

Symptoms.—It commences with feverishness, and soon after small papules are produced, which are most numerous on the face and the extremities, and gradually grow until they reached the size of a sixpence. At the end of a few days a pustule forms on the elevation, and bursts, leaving a thick crust, beneath which ulceration takes place; on this ulcer large granulations grow, giving an appearance which has been compared to a raspberry, but eventually these cicatrize and heal. This condition may go on for months, during which successive crops of the pustules may be produced. The constitutional symptoms are feverishness, sore throat, and sometimes dropsy.

Diagnosis.—There is no disease for which this can be mistaken.

Treatment.—No specific treatment is known; the ulcers must be treated with stimulating applications, and the strength must be kept up with stimulants and a generous diet.—MALCOLM MORRIS.

YELLOW FEVER.—There is much discussion amongst those who have had opportunities for the observation of cases of yellow fever, as to whether it is malarial in its origin, or of the nature of a specific contagious disease. Most authorities maintain the latter view, holding that true yellow fever is of the continued type, but that it may be simulated by malarial remittent fevers. There appears to be strong evidence proving that the disease can be conveyed by infection, and it has thus originated in seaport towns in this and other countries, owing to the arrival of vessels with cases of yellow fever on board. Fomites may be the means of propagating it.

Dr. Hamilton, in an excellent thesis on yellow fever, sums up his conclusions as follows:

1. That yellow fever is the highest development of a group of diseases which depend on some unknown cause, but which appears to be in some way connected with, or dependent on, organic decomposition.
2. That the various individual diseases of this group may change their type and pass one into the other, according to the intensity of the cause, or the more or less favorable conditions under which such cause acts.
3. That the general laws of zymotic diseases, as observed in this country, hold good for this group also.
4. That the same causes which augment or develop contagious properties in the zymotic diseases of this climate, will develop contagious properties in yellow fever.
5. And that consequently yellow fever may under such circumstances become contagious and spread.

In certain regions yellow fever is endemic, and it occurs also in severe epidemics. Its principal seats are the West Indian Islands, the seaports of North and South America, the south coast of Spain, Mexico, and the west coast of Africa. It requires a temperature of at least 72° F., and is rarely met with at an altitude of more than from 2,000 to 3,000 feet above the level of the sea.

Among the chief external predisposing causes are mentioned: long-continued high temperature, a swampy or low-lying and crowded district, filthiness and other anti-hygienic conditions. The disease is more liable to attack children, males, the white races, and those who have recently come into an infected district. Intemperance and other excesses, fatigue, and exposure to night air and dews also increase the liability to the complaint, while individual predisposition seems to exist in some instances.

Anatomical Characters.—The body may or may not be emaciated. The skin is of a deep yellow color, as well as much congested in dependent parts, and in those distant from the centre of circulation. The tissues are generally soft and flabby. More or less congestion of organs is observed, sometimes with extravasations of blood, and effusions into serous cavities. Softening of the heart, with molecular degeneration of its fibres, is usually met with, and the blood coagulates imperfectly, though soft clots are generally found in the cardiac cavities. The stomach is the most frequent seat of morbid changes. It often contains more or less "black vomit," or blood undergoing alterations. Sometimes a black or bloody mucus sticks to the lining membrane. Signs of congestion or inflammation are present in most cases. An inflammatory condition has been described in connection with the membranes of the cord, and in the sympathetic system.

Symptoms.—The prominent symptoms of yellow fever vary in different epidemics, and cases exhibit all grades of intensity, from a very mild form of the disease to one of the most malignant type. Usually three stages may be recognized, following a period of incubation, the duration of which is usually from two to four days, but it is said that it may range from one to fifteen days.

1. *Invasion Stage.*—The attack may be preceded by premonitory symptoms, or may come on quite suddenly Chills generally occur at the outset, but are not always observed in tropical climates. These alternate with a sense of heat, and soon there is marked pyrexia, its degree being in proportion to the previous chills, the temperature presenting a morning remission. The pulse is frequent, and in most cases full and strong. The face

is flushed, the eyes are red and suffused, and the expression is anxious and distressed. The skin feels hot, dry, and harsh. The tongue is covered with a white fur, moist, red at the tip and edges, with enlarged papillæ. Sore throat may be complained of, and there is a constant desire for cool drinks or ice. Gastric symptoms may be present from the first, but as a rule they only become prominent in from twelve to twenty-four hours. These symptoms include a sense of oppression, uneasiness, weight, or burning pain in the epigastrium, with considerable tenderness, nausea, violent vomiting and retching, the vomited matters being of a bilious character, or containing streaks of blood or chocolate-colored flocculi. After a while the stomach rejects everything without any effort. There is usually obstinate constipation with unhealthy stools, which are deficient in bile, and there may be much flatulence. The urine is deficient in quantity, of dark color, and usually contains albumen.

Nervous symptoms are most distressing in the majority of cases. Severe frontal headache is complained of from the first, with shooting pains in the temples and eyes. One of the earliest and most prominent symptoms in most instances, however, is pain in the lumbar regions and limbs, which often become so intense as to elicit screams and groans, and to make the patient writhe in agony. As this stage advances the patient becomes very restless, the mind is confused, or wild, violent delirium may set in, attended with hallucinations. Occasionally, there is more or less stupor.

The invasion stage lasts from a few hours to two or three days usually, but it may extend to four or five days. It is longer in the milder cases.

2. *Stage of Remission.*—A marked improvement is observed at the close of the first stage, which in most cases is only temporary, but sometimes is permanent, convalescence setting in, preceded by critical discharges. The symptoms subside more or less completely, the patient feeling comparatively comfortable and often hopeful, occasionally appearing to be quite well. But at this time there are frequently some unfavorable signs—namely, more marked tenderness in the epigastrium, a yellowish tinge of the skin and urine, a slow pulse, and sometimes heaviness or stupor. The duration of this remission is usually but a few hours, but may be prolonged to twenty-four hours.

3. *Stage of Collapse or Secondary Fever.*—In most cases signs of collapse appear, with great prostration and debility. The skin generally assumes a yellow, orange, or bronzed hue, but not invariably. This spreads from the forehead downwards, and is dependent upon the coloring matter of the blood. The circulation is impeded, the pulse becoming very rapid, weak, and irregular, while capillary congestion or stagnation is observed in dependent and distant parts, sometimes accompanied with petechiæ and vibices; at the same time the heart may be beating violently. In bad cases hæmorrhages are common, especially from the mucous surfaces. The tongue tends to become dry, brown, or black, or it is smooth, red, and fissured; at the same time sordes may form on the lips and teeth. The gastric symptoms return and become very intense. The so-called black vomit sets in by degrees, the black color being probably due to altered blood. It is often preceded by white vomit. Black vomit is not a constant symptom, and the exact characters of the vomited matters vary, pure blood being sometimes discharged. Similar materials may pass off in the stools. The urine is often more or less deficient, and contains albumen; it is sometimes entirely suppressed or retained. The patient frequently lies in a state of apathy and gloomy indifference. Ultimately collapse becomes extreme, with a cold, clammy skin, slow sighing respiration, and hiccough. Consciousness may be retained to the last, or low delirium or coma may set in, with convulsions at the close.

In some cases the symptoms of this stage of yellow fever are those of more or less intense secondary fever, instead of collapse. This course of events may terminate in convalescence, or the fever assumes a typhoid type, ending fatally.

Varieties.—As already stated, great differences are observed in the intensity of the symptoms of yellow fever, and also in the nature of the phenomena which are most prominent in different cases. Some patients are prostrated at once, and die very speedily. The named varieties are: 1. Algid. 2. Sthenic. 3. Hæmorrhagic. 4. Petechial. 5. Typhous. These several terms indicate the prominent characters which are peculiar to each variety.

Prognosis.—Yellow fever is always a terrible disease, but the mortality varies much in different epidemics. Death usually takes place from the fourth to the sixth day, but may be delayed to the ninth or eleventh day, or even to a much later period than this. It has been observed that many apparently hopeless cases recover, while others which seem to be mild prove speedily fatal; hence the prognosis is very uncertain. A concise list of favorable and unfavorable signs is given by Dr. Macdonald in Reynolds's *System of Medicine*, vol. 1, p. 492.

Treatment.—Attention to all hygienic measures and rules of health is of prime importance in the treatment of yellow fever. At the outset hot drinks and warm foot-baths have been recommended, with emetics and purgatives. Large doses of calomel or of quinine used to be given, but they have been proved to be injurious.

It is important to excite free action of the excreting organs as soon as possible. Copious enemata containing turpentine are serviceable. Saline drinks may be given abundantly. The skin should be sponged, or wet-packing may be resorted to if the patient is very hot. In the recent epidemic of yellow fever which has occurred in America, it is affirmed that a patient was restored when apparently in a hopeless condition, by being placed in a net under which an india-rubber sheet was hung, and constantly syringed with iced water. Liquid food should be given in small quantities, with cool drinks and plenty of ice. Alcoholic stimulants well-diluted are also valuable. Champagne is most beneficial if it can be obtained.

Various symptoms require attention, but especially vomiting. For its relief lime-water and milk, hydrocyanic acid, creasote, chlorodyne, and chloroform have been found most useful. Great care must be exercised in the administration of opium or morphia, particularly if there is any tendency to suppression of urine. Chlorodyne is suggested as a substitute, in order to procure sleep and to relieve pain; hot applications or mustard poultices being also applied externally over painful parts. Hæmorrhages, collapse, and typhoid symptoms must be treated by the ordinary remedies. During convalescence quinine may be given, if recovery should take place. —FREDERICK T. ROBERTS.

ZOSTER.—*Definition.*—Zoster is a disease of acute and typical course and benign nature, characterized by the eruption of groups of vesicles or erythematous papules, which correspond in situation with the peripheral distribution of a cutaneous nerve—usually on one side of the body—and are produced through the influence of irrritative lesions of the nervous system.

Following the classificatien of Hebra, zoster is divided into the following varieties:

1. Zoster capillitii
2. Zoster faciei.
3. Zoster nuchæ et colli { occipito-collaris.
   cervico-subclavicularis.
4. Zoster cervico-brachialis

5. Zoster pectoralis.
6. Zoster abdominalis.
7. Zoster femoralis.

Symptoms.—Usually after a few days, sometimes a few weeks, of neuralgic pains, either over the whole region which becomes subsequently affected or at certain fixed spots corresponding with points of division or emergence from the deeper tissues of cutaneous nerves, the eruption appears suddenly. It consists of an efflorescence of bright-red papules, about the size of millet seeds, on an erythematous surface, and is accompanied usually by a burning sensation. Within a few hours, or in a day or two, the papules become vesicles, from the size of a pin's head to that of a pea, filled with a clear serous fluid; they are either quite isolated or closely aggregated, and sometimes by confluence from an irregular bulla. Successive crops of vesicles may prolong the eruptive stage for a week, but each series has all its vesicles at the same stage of development; thus one group may be popular, another vesicular, and a third already desiccated.

After a day or two the contents of the vesicles become opaque and purulent; they then dry up, forming yellow scabs, which usually, about a fortnight after the onset of the affection, fall off, leaving reddish-brown stained patches. Successive efflorescences may, however, prolong the total duration of the disease to three or four weeks, but they always appear upon adjacent portions of skin, never on that implicated by the first eruption. The vesicles may be few in number, and confined to a circumscribed area, or closely aggregated along the whole course of a nerve; in the latter case the pain and constitutional symptoms are somewhat severe, and the duration of the attack more prolonged,

As zoster is not usually a fatal disease, cases in which the cause has been ascertained by autopsy are rare. Barensprung, Charcot, Wagner, Kaposi, and others have found, as the most frequent cause, hæmorrhage and inflammation of the intervertebral or Gasserian ganglia.

New growths, carcinomatous, tubercular, or purulent collections, causing irritation of the adjacent nerve trunks, or ganglia; traumatic lesions, causing irritation of the peripheral, sensory, or mixed nerves, and meningitis; caries of the vertebræ or locomotor ataxy, causing irritation of the posterior roots—are frequently attended with eruptions of zoster. It has also been noticed, after poisoning with carbonic oxide gas, and occasionally during the administration of arsenic (Hutchinson). Hebra and Kaposi, on whose descriptions this account is mainly based, consider as abnormal the following variations in the course and consequences of zoster:

1. Cases in which some part or all of the eruption remains papular and aborts or forms bullæ or pustules, the latter causing destruction of the dermis and giving rise to lasting cicatrices.

2. Cases in which blood appears in the contents of the vesicles, or hemorrhagic infiltration of their bases occurs. In the latter the vesicles burst, the infiltrated tissue of their bases slowly necroses, and extremely painful ulcers, which take weeks or months to heal, and which leave permanent scars, are produced.

3. Cases in which neuralgia does not abate with the efflorescence, but persists during and long after the eruption. This is rare in the young, more common in the aged.

4. Cases where muscular atrophy, anæsthesia, alopecia, or loss of teeth or atrophy of the alveolar process occurs after the zoster.

5. Bilateral symmetrical zoster.

Zoster usually occurs but once in a lifetime; it rarely passes the middle line before or behind, and then only slightly; it appears at all ages and in both sexes; it affects either side of the body indifferently, being, according to statistics, slightly more common on the right. The groups of vesicles formed are, according to Hebra, always nearest the nervous centres, the subsequent crops lying more towards the periphery of the corresponding nerves.

1. *Zoster Capillitii,* best seen in bald persons, occurs on the scalp in the peripheral distribution of the supraorbital and great occipital nerves, and sometimes forms an arch over one parietal bone, terminating near the coronal suture.

2. *Zoster faciei* presents the greatest variety of appearances. Groups of vesicles, limited accurately by the middle line, may appear on the forehead along the course of the supraorbital nerve; at the inner angle of the orbit and root of the nose along the supratrochlear; on the cheek, ala nasi, and lower eyelid along the infraorbital; and in the mouth, palate, and pharynx from implication of the palatine branches of the superior maxillary. Vesicles may appear on the gums, associated with violent toothache, loosening and loss of the teeth, and atrophy of the alveolar process when the superior dental is affected. The eruption may also appear in the region of the auriculo-temporal, on the temple, pinna and meatus of the ear, on the chin, the mental branch, and on the side of the tongue in the course of the lingual. When the whole region of distribution of the ophthalmic branch of the fifth nerve is affected, in addition to the zoster frontalis, there are vesicles, very often hæmorrhagic, on the nose and nasal mucous membrane, from affection of the infratrochlear and ethmoidal twigs; vesicles on the temple and malar prominence, from the zygomatic and lachrymal branches; and conjunctivitis, corneal ulcers, and iritis, from affection of the long root of the lenticular ganglion. Ophthalmitis, thrombosis of the ophthalmic vein, septicæmia, death may thus result from zoster ophthalmicus.

3. *Zoster Nuchæ et Colli.*—The variety occipito-collaris presents vesicles on the back of the neck from the great and small occipital nerves, on the posterior surface of the pinna and lobule (great auricular), and on the side of the neck and beneath the chin. The variety cervico-subclavicularis occurs in the region of distribution of the ascending and descending cutaneous branches of the cervical plexus, on the region of the neck below the scalp back as far as the shoulder, and downwards as far as the skin between the clavicle and nipple.

4. *Zoster cervico-brachialis* affects the brachial plexus, and presents groups of vesicles on both sides of the arm and forearm as far as the little finger, and on the second and third intercostal spaces as far as the sternum.

5. *Zoster pectoralis* occurs:

a. As a continuous band of vescicles, occupying one to three intercostal spaces, running from the spine to the sternum; to this the terms zona and shingles were originally applied. The vesicles not unfrequently coalesce, and are sometimes hæmorrhagic; in the latter case the pain is excessive.

b. As patches of vescicles, one usually near the spine, corresponding to the hinder branches of the dorsal nerve; one on the side of the thorax, where the twig of the intercostal nerve penetrates the muscles, and a third near the sterum, at the termination of the nerve. The spinal and sternal groups may pass the middle line about half an inch, and even in bilateral zoster the groups never coalesce to form a complete girdle, as the ends overlap. One group only may be present.

The intense pain in the side and the dyspnœa may sometimes lead to a suspicion of pleurisy.

6. *Zoster femoralis* presents groups of vesicles, appearing usually first on the buttock, to which region they may be confined, or on the front or on the back of the thigh, and they may extend downwards to the ham or calf. On the penis zoster pudentalis, from affections of the pudic nerve, may occur, but is sharply restricted to one side of the organ (Kaposi).

Diagnosis.—The sudden appearance, usually preceded by neuralgic pain, of a group of vesicles situated on the peripheral distribution of a cutaneous nerve, and the course of the affection, are sufficient, even in abortive cases, to distinguish zoster from any other vesicular disease of the skin.

Prognosis.—Zoster is a benign disease. An extensive efflorescence of the hæmorrhagic form, with slow healing, painful ulcers, or severe neuralgia, may wear out an aged, weakly person, but death rarely results except from some intercurrent malady.

Treatment.—No internal or local remedies have yet proved of the slightest use in cutting short an attack of zoster; all that remains to be done, therefore, is to palliate the severity of the symptoms, and to let the disease run its natural course, avoiding, as worse than useless, any attempt, by cauterization or otherwise, to check the formation of the vesicles. Dusting with powder, and covering with cotton-wool and a bandage to prevent the clothes rubbing the vesicles, and, if ulcers form, dreasing in the usual way, is all that is needed locally. Should the pain be intense, narcotics by the mouth, or better still hypodermically, ought to be used. The subsequent neuralgia, which is often severe in the aged, is best treated by quinine and arsenic in full doses, and by the repeated application of the continuous current.—Malcolm Morris.

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